Construction Methods

FEBRUARY 1946

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DETROIT

ELEPHANT TRUNK receives concrete from belt conveyor and delivers it to invert slab of Wyttle Creek flood control channel in California

Flood Control Contractors Beat California Rains

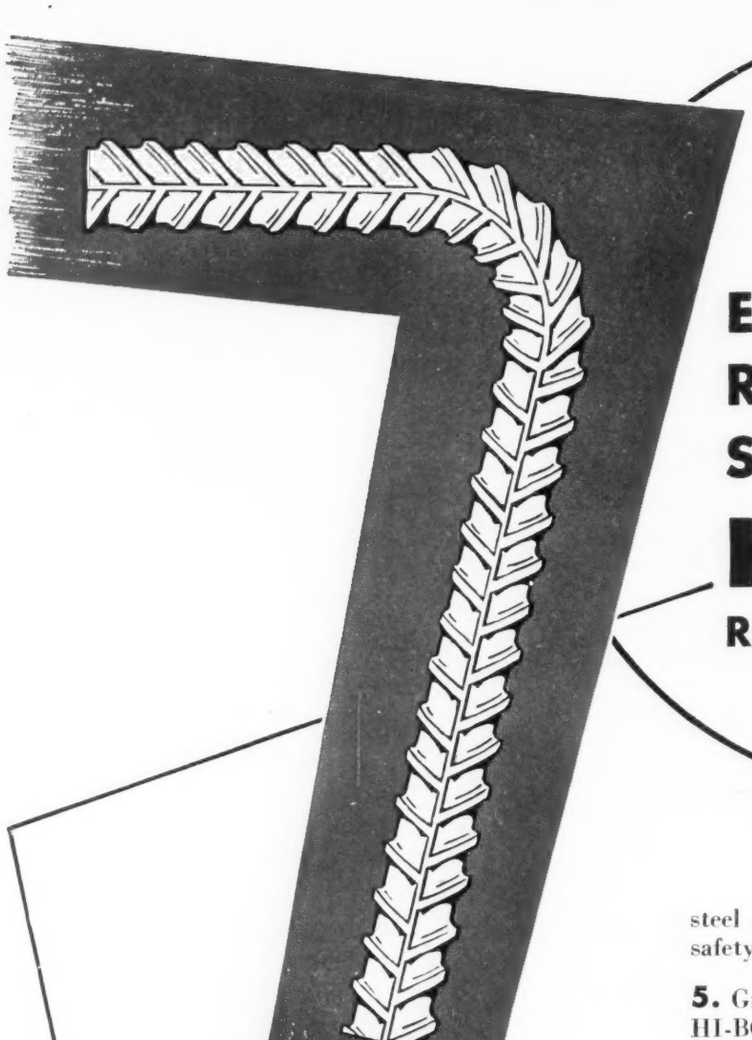
Caisson Underpinning Checks Settlement of Concrete Grain Elevators

O. W. Swenson and Miles I. Killmer Receive Moles' Construction Awards

Concrete Arch Roof of 111-Ft. Span Covers Navy Testing Basin

Atomic Bomb Highway Entails Canyonside Construction

Material Handling Devices at Seabees' Supply Base



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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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FEBRUARY, 1946

Cuts and Fills

Not so long ago contractors and equipment men were worrying about a possible disastrous postwar surplus of equipment released by the military. They now wish such fears had come to pass, for not only is there no surplus of used military equipment—there is no equipment. Strikes and lack of materials and parts have dried up the rapidly dwindling production of new units. Contractors will have to get along for some time with equipment on hand. One consolation, however, is the fact that the same forces restricting equipment output have also slowed up the start of new construction. By the time construction really gets under way new equipment should be rolling at a rate sufficient to take care of it.

Construction is more than machines and blueprints and cement and steel—it is also men with brains and vision and ability. Starting with this issue *Construction Methods* will pay tribute each month to an outstanding construction man who has performed a service for his industry. This feature bears the head, "Cited for Service." We start with that big Texan, Warren S. Bellows, who has devoted much of his time for the last several years to labor relations and to contractor association activities, and now takes over as president of the AGC for the current year. Bellows is a fine example of the men who make construction what it is today.

Roadbuilders at the recent ARBA meeting in Chicago were champing at the bit to get going on the nation's 3 billion dollar road program. They were really concerned lest a delay on the part of some states might result in forfeiture of federal aid. On the reasoning that roadbuilding must be undertaken quickly to salvage an investment in non-maintained roads and to increase the safety of the entire highway system, as well as to aid the economic job of reconversion, the Road Builders' engineer-director Charlie Upham urged highway officials to award contracts on bids that were not more than 35 to 45 percent above 1939 prices. Gen. Fleming, head of FWA, took a divergent view, declaring that bids are way out of line and that contractors are taking advantage of the times to bid high. Yet with the construction cost index now registering exactly 35 percent increase over the 1939 average, and in the face of uncertain labor, material and equipment conditions, it seems as though the contractors have powerful arguments on their side. If they are right, owners and public officials will have to face the fact that construction costs are up, and will stay up for a long time to come.

A group of West Coast contractors have licked the lumber shortage by buying a complete Arkansas sawmill, with ample stands of timber, and hiring a Chicago lumber outfit to run it for them. If the present tight conditions persist, we may see contractors burning their own brick, grinding their own cement, and pouring their own steel—and possibly the timekeepers and foremen laying the brick, pouring the concrete and erecting the steel.

THE *How* OF IT

FEB 22 1946

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **PREFABRICATED HOMES** were moved to relieve housing shortage in state of Washington —p. 76
How **WILLOW RUN BOMBER PLANT** was converted to auto production —p. 77
How **CAISSON UNDERPINNING** checked settlement of concrete grain elevators on waterfront —p. 78
How **ATOMIC BOMB HIGHWAY** was carved out of canyon's side to provide access to New Mexico war research project —p. 82
How **MATERIAL-HANDLING DEVICES** expedited receipt, processing and shipment of equipment to Seabees —p. 84
How **FLOOD CONTROL CONTRACTORS** beat California rains —p. 88
How **CONCRETE ARCH ROOF** over Navy testing basin was insulated to check condensation —p. 92
How **SHEET METAL CANOPY** over tractor cab protected operator from falling rock —p. 98
How **HOMEMADE SPRAY GUN** applied special compound to prevent weld spatter from attaching itself to metal —p. 98
How **PORTABLE BLASTING BULKHEAD** prevented muck from flying from tunnel headings —p. 99
How **SAFETY DOOR,** built to swing both ways, avoided damage to tunnel equipment —p. 99
How **BITUMINOUS CONCRETE** was used for pavement widening and resurfacing in Ohio —p. 100
How **STRAIGHTEDGE SHOE** was attached to paver to control grade of material —p. 101
How **AUTOMATIC RAKING DEVICE** attached to paver pulled excess coarse aggregate away from longitudinal joint—p. 102
How **TRAILER-LAUNCHED SCISSORS BRIDGE** was installed to carry heavy equipment —p. 110

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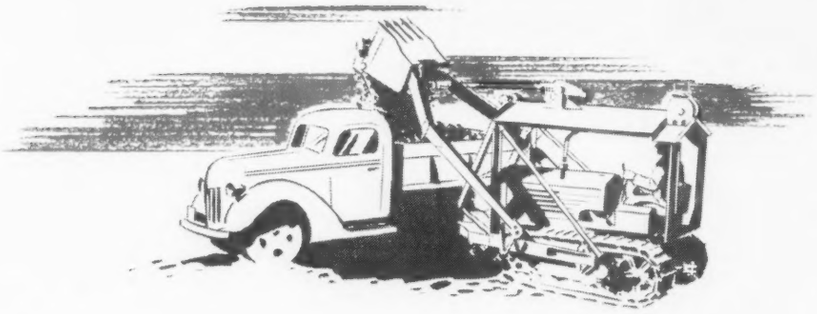

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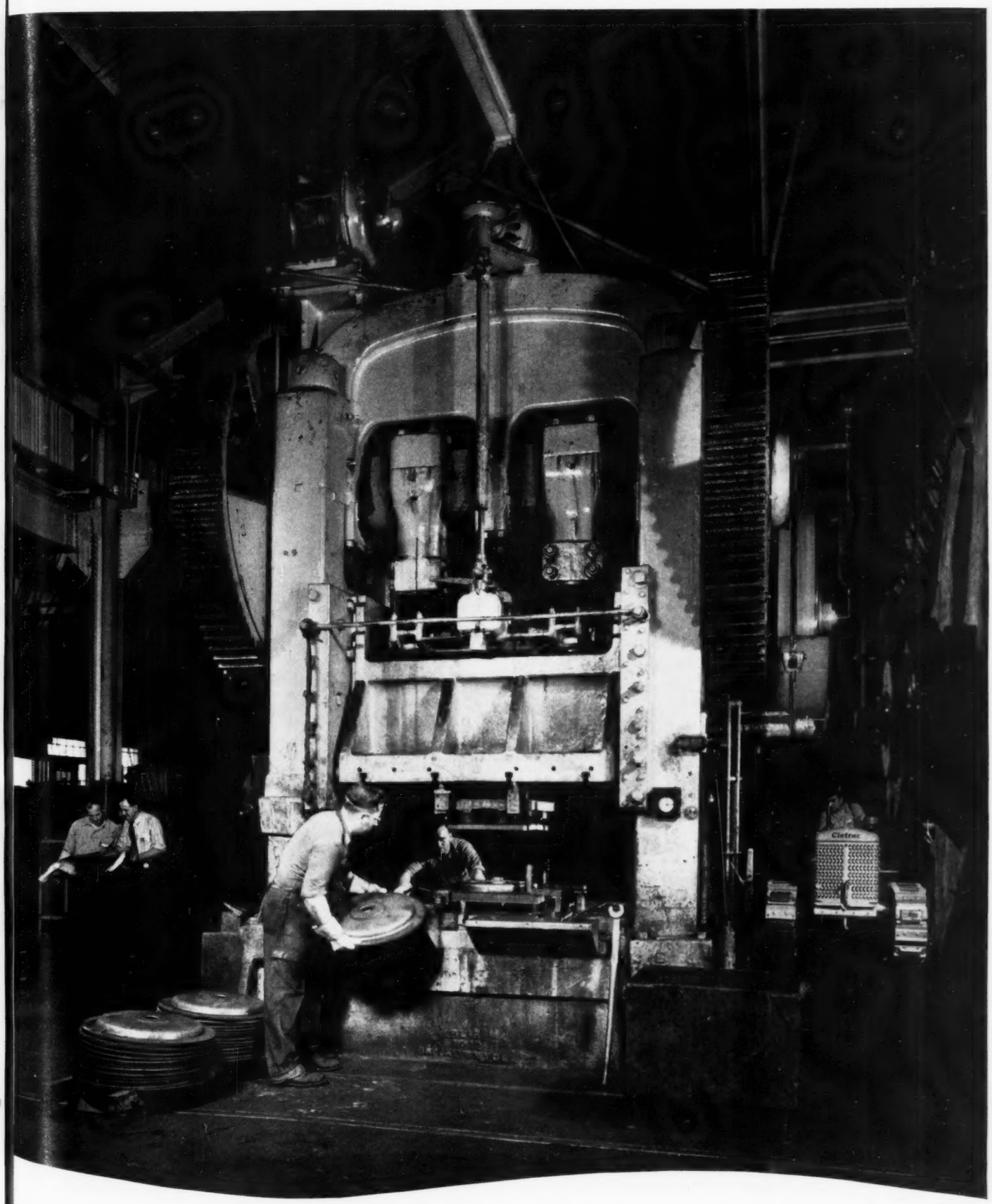

Forming rear wheel discs on a 450-ton press in the OLIVER "Cletrac" plant

THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

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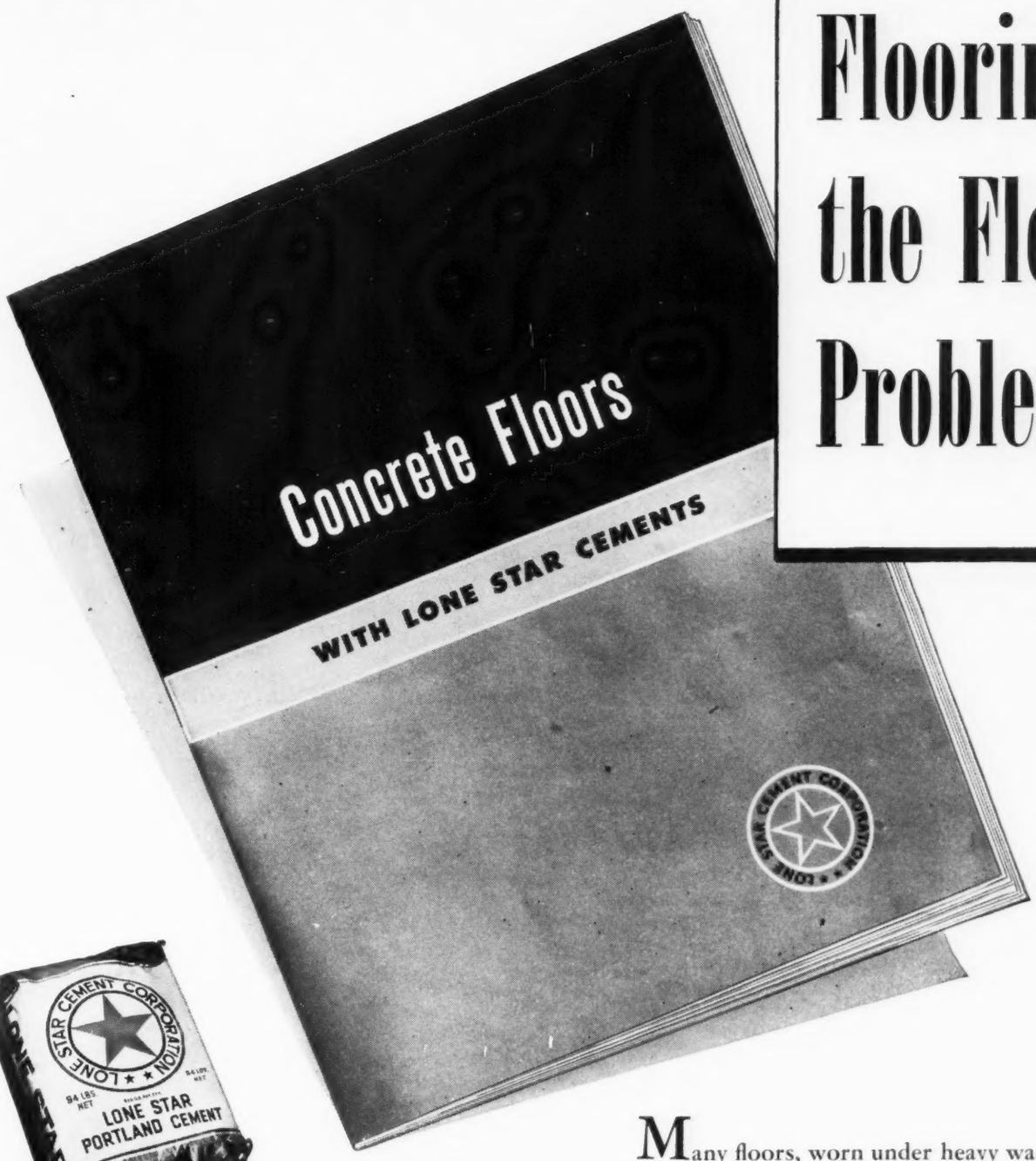
"What we really need is a whole new roller."

Flooring the Floor Problem



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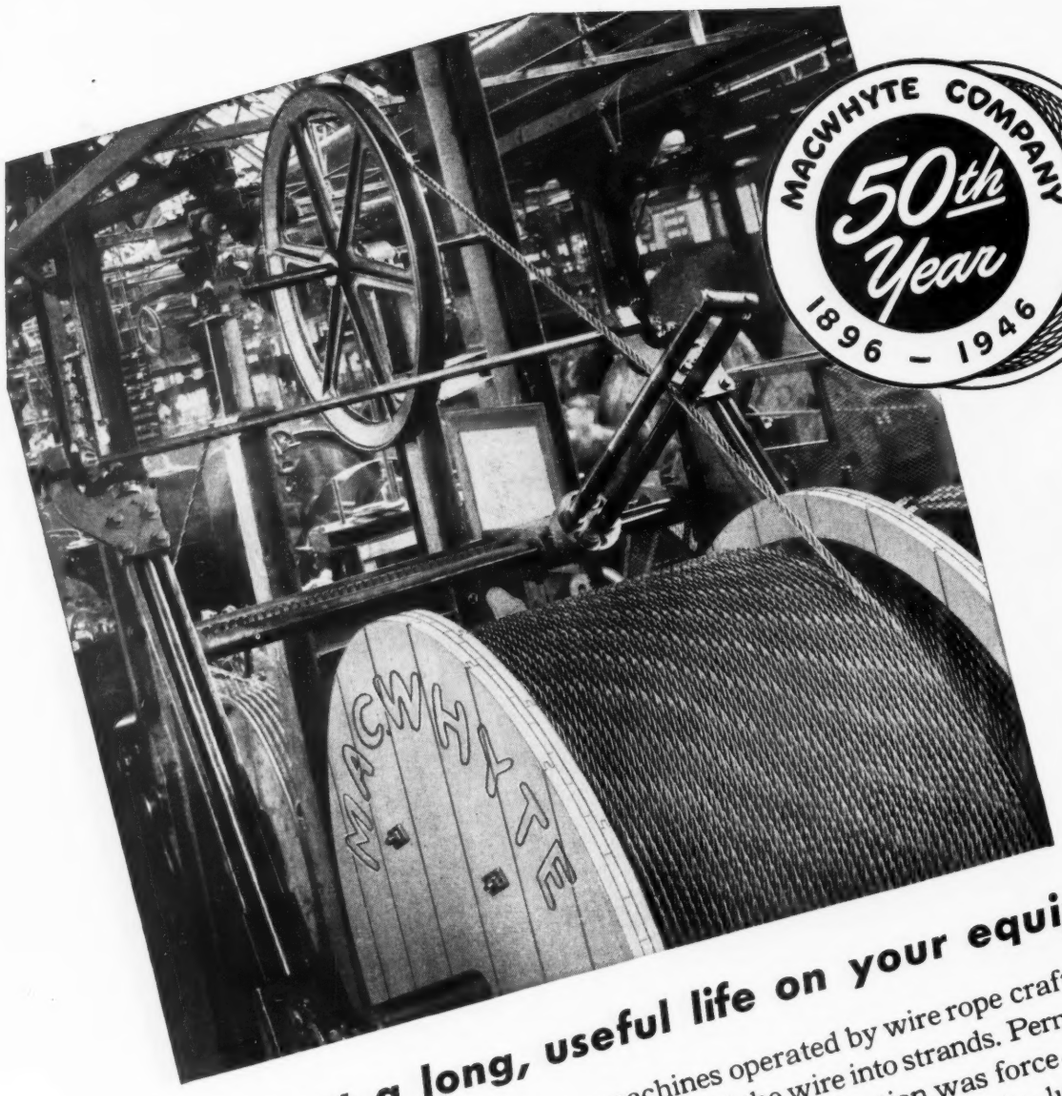

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1896 – 1946

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Of the total 30,369,500 cu. yds. let on contract * in 1945, 81% is yardage hauled by Euclids. On many of the large contracts Euclid hauling equipment is being used exclusively.

This unusual record is the result of the fine performance of Euclids on levee work for many years. Their large capacity, flotation and tractive power, and ease of handling are some of the reasons why Euclids have consistently hauled more levee dirt than other makes and types of earth moving equipment.

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*Memphis, Vicksburg and New Orleans districts.

The EUCLID ROAD MACHINERY Co.
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EUCLID EARTH MOVERS

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Capacities of 15 to 22 tons — 9.2 to 20.7 cu. yds., struck . . . loaded top speeds of 22 to 35 m.p.h. . . . powered by 150 to 275 h.p. Diesel engines.

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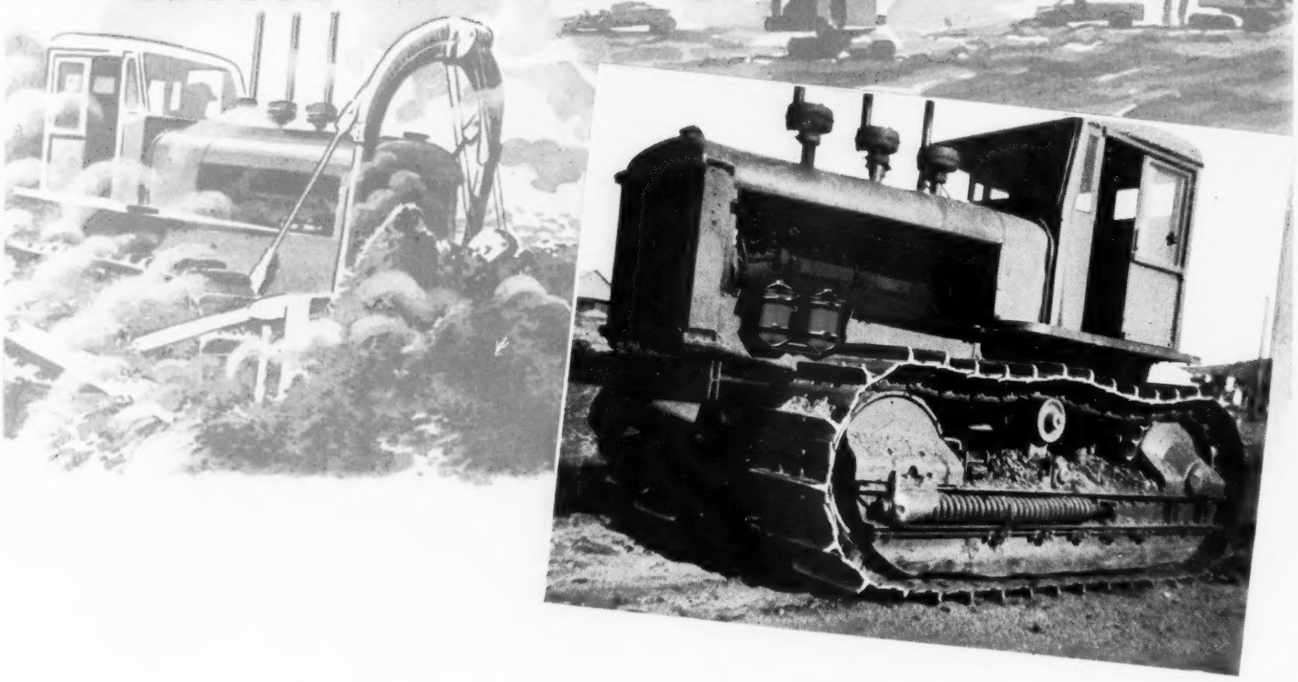
Head Off Costly Repairs with FRAM Oil Filters!



Dirt, dust, grit and abrasives, ever present on most construction jobs, can wear away the moving parts of any engine to cause overhauls, breakdowns and repairs. At the same time, sticky sludge, a constant enemy of internal combustion engines, can literally "gum up the works" to increase wear, decrease efficiency. But with a heavy-duty Fram Filcron oil filter, these contaminants are filtered out to keep oil physically and visually* clean. Thus, Fram saves overhauls, repairs, and costly delays—lengthens the life of engines!

Fram filters are engineered for the efficient, adequate, and economical filtration of lubricating oil on practically any type of gasoline, gas or Diesel engine, either wet or dry sump with conventional type pressure lubricating system or may be connected to scavenger line.

These filters contain the amazing Fram Filcron cartridge, proved the most efficient filtering agent yet developed and widely used by the Army and Navy during the war. They are unique in that the oil may be circulated through the filter for warming purposes without bleeding from the pressure system, and consequently pump capacities are only slightly affected. This permits a flow of cleaned oil only from the filter. They may also be connected in the same manner as conventional waste pack filters so that by-passing takes place in the filter and the effluent is mixed dirty and cleaned oil. Even when installed in this manner, the demand on the pump is less than that created by conventional filters. For information on Fram Filcron filters, write: Fram Corporation, Providence 16, R. I. *In Canada:* J. C. Adams Co., Ltd., Toronto.

** Certain heavy-duty oils, due to the type of detergent additive used, will turn dark in color almost as soon as put into the motor. Where such oils are used, filter cartridges must be changed on an hourly basis.*

Fram Engineering Service and Laboratory are available to assist in determining the proper installation for both lube and fuel oil filters.

FRAM *Filcron*

THE MODERN OIL FILTER

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This shield, an exclusive B. F. Goodrich feature, is a set of four breakers — layers of rubber-coated rayon cords — between the tread and the plies. These breakers are in *pairs,* with the cords in each pair running parallel to each other — but with each pair running in opposite directions to give balanced strength. The breakers are cushioned with thick layers of shock-resistant rubber.

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By ordering all the steel needed for a highway job from Bethlehem you'll get quick, reliable service—service that will save you money, paper-work and the possibility of idle men and equipment. It will pay you to buy steel from Bethlehem, for the big jobs ahead!

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MARMON-HERRINGTON *All-Wheel-Drive Trucks*

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with Clyde Gasoline Hoists

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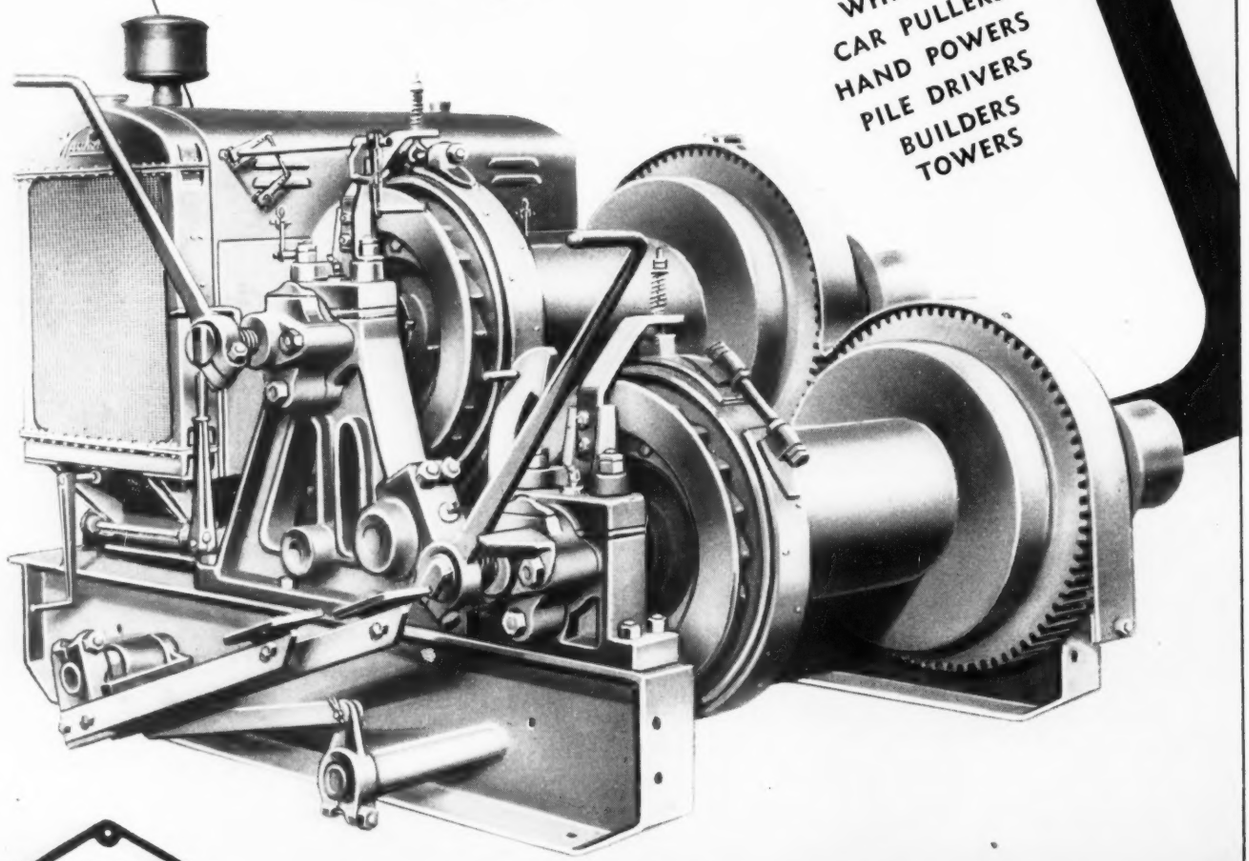

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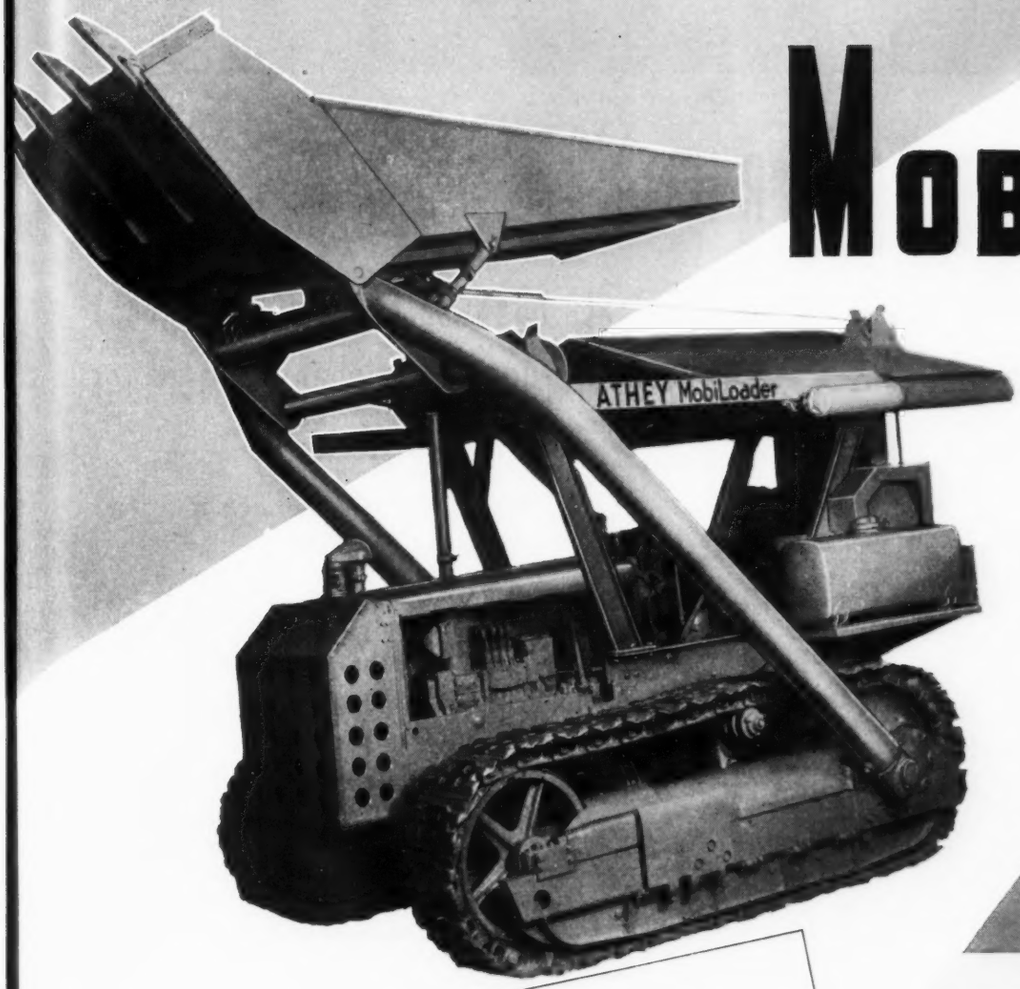
Duluth 1, Minnesota

The New W4-5 Athey MobiLoader



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HIGHLIGHTS OF THE NEW W4-5

☆ ☆ ☆ ☆ ☆ ☆

MORE STABILITY ☆ HYDRAULI "FINGER-TIP" CONTROL ☆ BETTE VISIBILITY ☆ GREATER PRODUCTIO ☆ SIMPLIFIED DESIGN ☆ OPERATE WITH "CATERPILLAR" DIESEL D TRACTOR.

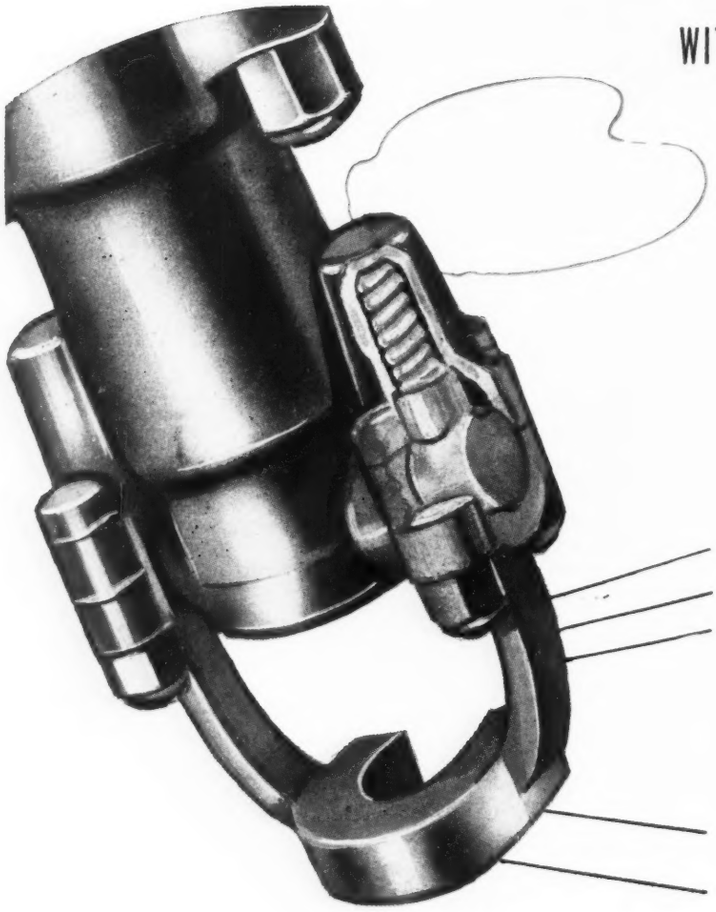
☆ ☆ ☆ ☆ ☆ ☆

Athey

Why leading contractors

The DRILL RUNNER *knows that...*

STEEL CHANGES ARE QUICK AND EASY WITH THOR'S DIRT-PROOF, JAM PROOF STEEL RETAINER



You won't find an operator of a Thor Rock Drill carrying a hammer or pry-bar to pound the retainer free for steel changes . . . because the Thor retainer is easily opened by hand throughout the life of the tool. *Fully enclosed* to prevent jamming by dirt or rock, the tension spring in the Thor retainer cannot be over-tightened. Lubrication is done without dismantling the retainer so it *always* works easily to speed steel changes and reduce friction and wear.

This feature alone makes Thor Rock Drills *preferred* by operators. Add smooth performance and easy handling and you'll see why runners get more footage per shift—every shift—with Thor.

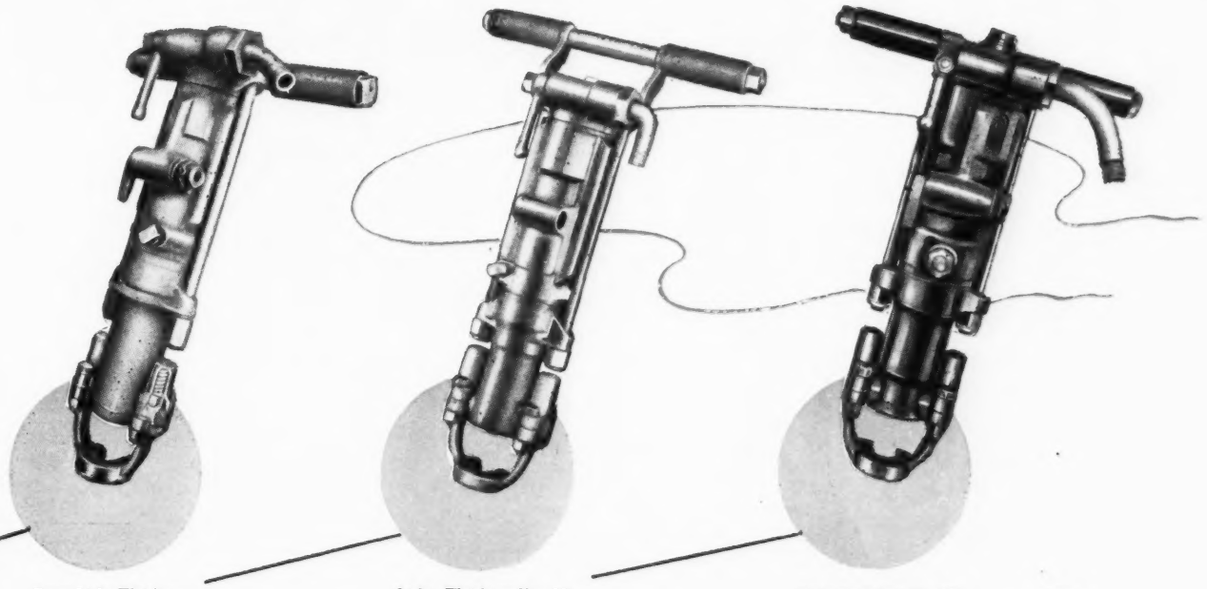
INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois

Birmingham Boston Buffalo Cleveland Detroit Los Angeles
Milwaukee New York Philadelphia Pittsburgh St. Louis
Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

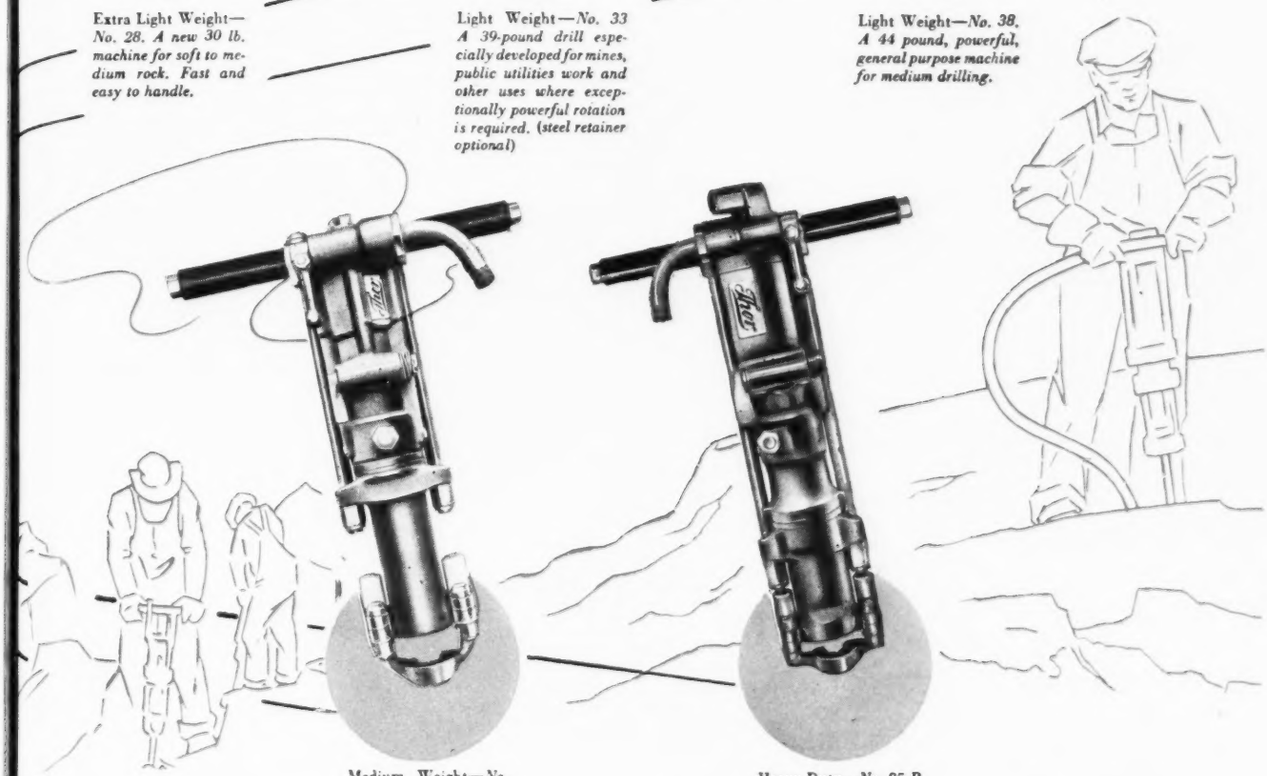
SPECIFY *Thor* ROCK DRILLS



Extra Light Weight—*No. 28. A new 30 lb. machine for soft to medium rock. Fast and easy to handle.*

Light Weight—*No. 33 A 39-pound drill especially developed for mines, public utilities work and osher uses where exceptionally powerful rotation is required.* (steel retainer optional)

Light Weight—*No. 38. A 44 pound, powerful, general purpose machine for medium drilling.*



Medium Weight—*No. 70 Series. 3 tools in the 55 pound class—powerful and fast for deep-hole drilling in hard rock.*

Heavy-Duty—*No. 85-B An 80 pound machine for deep drilling in the hardest kind of rock formations.*

Introducing

"CATERPILLAR" SCRAPERS

WITH THESE DISTINCTIVE FEATURES FOR "LOWEST COSTS ON EARTH"

1 "COMPLETE PACKAGE" EARTHMOVER

Tractor and scraper built to work together • One high standard of material and workmanship • One service source—the best in the business.

2 OPEN-BOWL DESIGN FOR:

Greater stability • Good visibility • Loading with shovel or dragline.

3 OPTIONAL TIRE SIZES FOR:

Correct flotation • Tires matched to the job • Minimum rolling resistance • Bigger pay-loads • Longer tire life.

4 DOUBLE-CURVED, SELF-SHARPENING CUTTING EDGES FOR:

"Live loading" with longer boiling action • Digging hard material • Shorter loading distance • Less loading time.

5 HIGH APRON LIFT TO CLEAR THE STICKIEST MATERIALS

6 POSITIVE, CLEAN EJECTION

7 LONG CABLE LIFE FROM:

Correct reeving • Over-sized, precision-grooved sheaves.

ANOTHER IN THE GREAT NEW LINE OF "CATERPILLAR" EARTHMOVING EQUIPMENT

First the bulldozers (recently announced), and now the *open-bowl* scrapers have gone into production. "Caterpillar" research projected them. "Caterpillar" engineering designed them. "Caterpillar" proving has okehed them after every conceivable test of performance — for mechanical efficiency, for work capacity, for long-lived stamina, for operating ease and economy.

As in every product "Caterpillar" offers, you may be sure that these scrapers are tops in the field — with features, materials and workmanship that give the earthmover undisputed profit advantages — per job or per life of product.

To individual mechanical superiority, "Caterpillar" Scrapers give you the further advantage of *one service source* when teamed up with "Caterpillar" Diesel Tractors . . . both made by the same manufacturer and kept in working condition by a single dealer organization unequaled for completeness.

See your "Caterpillar" dealer about these new "Caterpillar" Scrapers; about the new "Caterpillar" Bulldozers — and how, with "Caterpillar" Diesel Tractors, the advantages of ideally matched earthmoving equipment can be realized for the first time in construction history.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

THREE SIZES
STRUCK MEASURE

No. 80	13.8 YARDS
No. 70	8.7 YARDS
No. 60	6.0 YARDS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The discharged veteran wears this emblem. Remember his service and honor him.

HOISTS • BODIES • WINCHES
ROAD MACHINERY • CRANES
There IS a Reason
Gar Wood—World's Largest Manufacturer of Truck and Trailer equipment—earned this leadership through ability to engineer and build units of such outstanding performance that men who know equipment best specify Gar Wood.
BUY VICTORY BONDS
GAR WOOD INDUSTRIES, Inc.
DETROIT 11
MICHIGAN
GRAY PACIFIC DOCK CO.

Other Products: • TANKS • HEATING EQUIPMENT • MOTOR BOATS

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Des Moines—GLOBE MACHINERY & SUPPLY CO.

KENTUCKY
Louisville—NATIONAL EQUIPMENT COMPANY
Paducah—HENRY A. PETTER SUPPLY CO.

LOUISIANA
New Orleans—EQUITABLE EQUIPMENT CO.

MAINE
Portland—EASTERN TRACTOR & EQUIPMENT COMPANY
Presque Isle—ROY C. THOMPSON COMPANY

MARYLAND
Baltimore—MARYLAND SUPPLY & EQUIPMENT COMPANY

MASSACHUSETTS
Boston—PERRIN, SEAMANS & CO., INC.

MICHIGAN
Detroit—W. H. ANDERSON COMPANY, INC.
Grand Rapids—E. K. S. EQUIPMENT COMPANY
Iron Mountain—LAKE SHORE ENGINEERING CO.
Sault Ste. Marie—STRAITS ENGINEERING CO.

MINNESOTA
Duluth and St. Paul—BORCHERT-INGERSOLL, INCORPORATED

MISSISSIPPI
Jackson—WATKINS-ALDRIDGE EQUIP. CO., LTD.

MISSOURI
Kansas City—FUNKHOUSER MACHINERY CO.
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MONTANA
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NORTH CAROLINA
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Houston—SOUTH TEXAS EQUIPMENT COMPANY
Lubbock—FRED BERRYHILL EQUIPMENT CO.
Waco—CONTRACTOR'S EQ. SALES & SERVICE INCORPORATED

UTAH
Salt Lake City—THE LANG COMPANY

VIRGINIA
Norfolk and Roanoke—TIDEWATER SUPPLY CO., INCORPORATED
Richmond—INDUSTRIAL SUPPLY COMPANY

WASHINGTON
Seattle and Spokane—COLUMBIA EQUIPMENT COMPANY

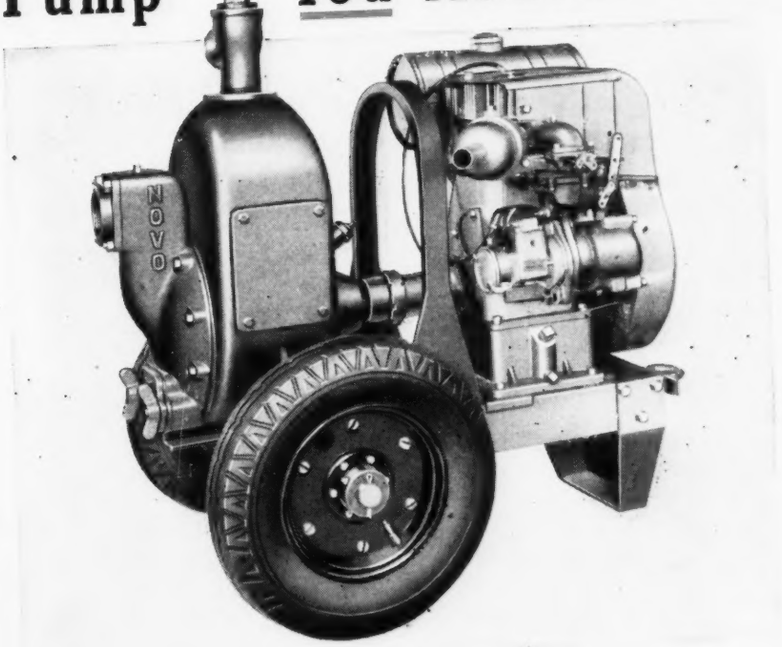
WEST VIRGINIA
Bluefield—BLUEFIELD SUPPLY COMPANY
Charleston—CLYDE W. BECKNER, INC.

WISCONSIN
Milwaukee—STONE MANUFACTURING CO.

NOVO NEWS

FEBRUARY, 1946

CONTRACTORS: Here's the Self-Priming Centrifugal Pump You Asked For!



The new Novo "Pronto-Prime" Self-Priming Centrifugal Pump was literally designed to *your* specifications. We asked hundreds of contractors exactly what features they wanted in their new pumps. The Novo "Pronto-Prime" pump is the direct result of this survey; it includes every important feature that *you*, from actual experience, have found necessary to efficient, trouble-free operation.

Super Speed Positive Priming—new improved design.

Long-lived "Stout-Hearted" rotating Neoprene seal – self-aligning, self-adjusting, oil lubricated.

Self-Cleaning – turbulence through oversized, streamlined water passages prevents settling and clogging.

Independent Pump Unit – permits servicing pump without removing power unit.

Serviceability—all wearing parts quickly accessible.

Many Mechanical Advantages – Two roller bearings. Universal base. Line-bored pump case. Adjustable wear plate. Replaceable cut-off. Wear resistant Novite alloy parts. Raised suction. Large drains.

Guaranteed to Equal or Exceed AGC Standards. "Pronto-Prime" performance is second to none.

Your nearest Novo distributor will gladly furnish more details.

Allied Member of A.E.D.

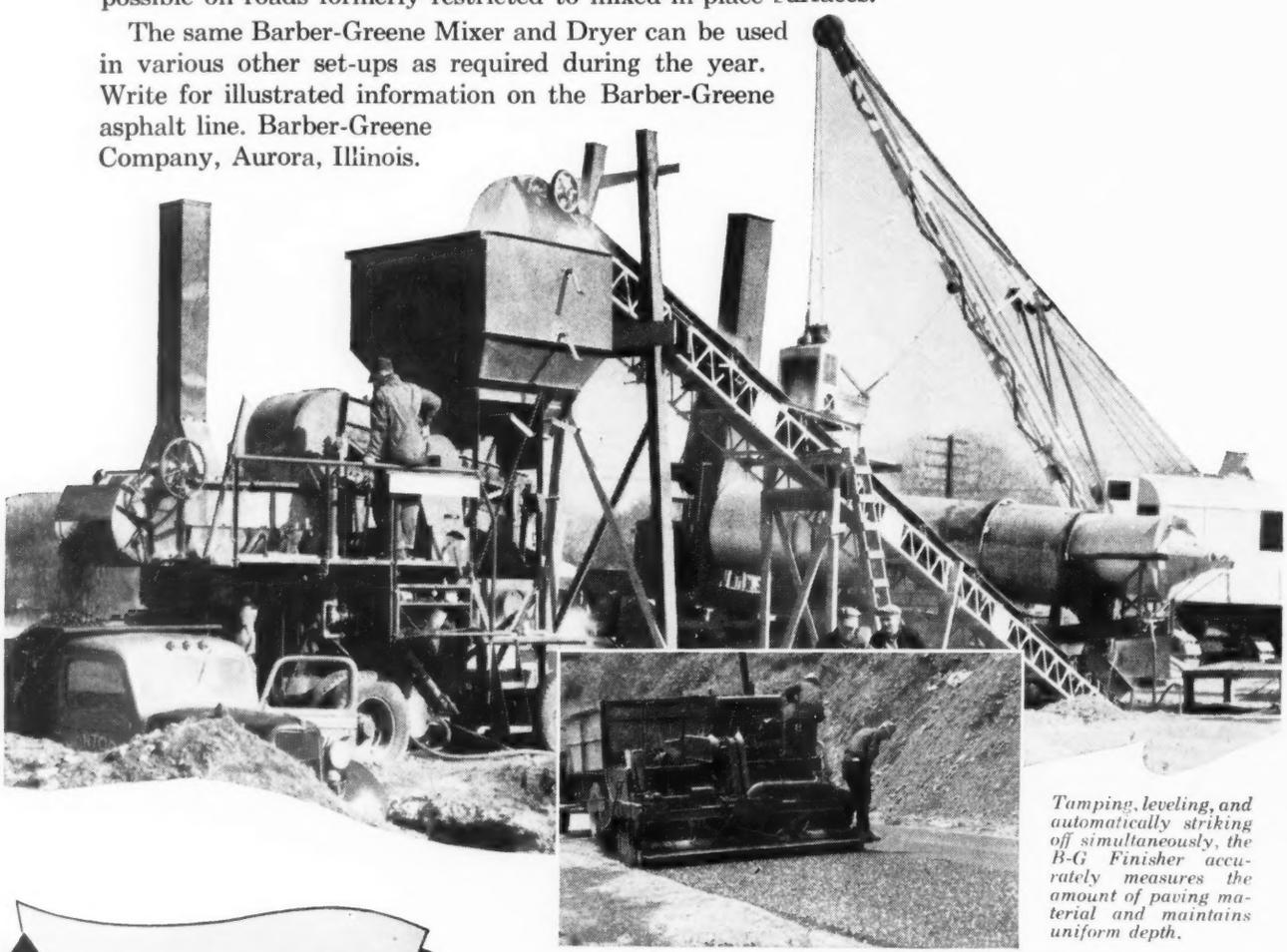
NOVO ENGINE COMPANY
LANSING 5, MICH. U.S.A.
CONTRACTOR'S EQUIPMENT
· GRAY IRON CASTINGS ·
ENGINES

How a B-G *Asphalt Plant* Provides "Intermediate" Mixing

• For "intermediate" roads—roads having traffic too heavy for a travel plant mat, but not sufficient to warrant the high type, densely graded Class I mixes—the Barber-Greene Mixer and Dryer may be combined to provide a plant quality mix at 10 to 120 tons per hour, depending on size of units.

Moisture content—responsible for the failure of many secondary pavements—is positively controlled by the B-G Intermediate Plant. In addition, use of heavier bitumens is permitted, producing a higher quality surface than can be obtained with road mix. And frequently at comparable cost. Temperature control gives this B-G plant a wide range of application, from road mix types to high quality asphaltic concretes. High capacity and low erection costs make high quality pavements possible on roads formerly restricted to mixed-in-place surfaces.

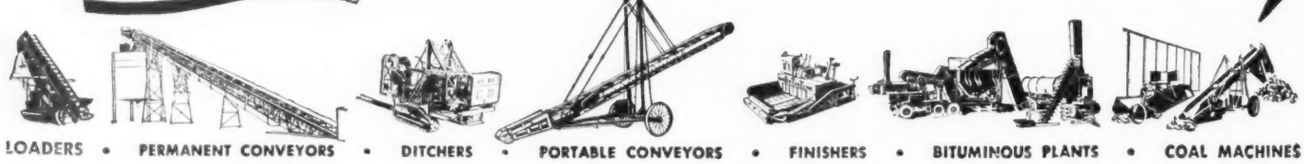
The same Barber-Greene Mixer and Dryer can be used in various other set-ups as required during the year. Write for illustrated information on the Barber-Greene asphalt line. Barber-Greene Company, Aurora, Illinois.



Tamping, leveling, and automatically striking off simultaneously, the B-G Finisher accurately measures the amount of paving material and maintains uniform depth.

46-10

Barber-Greene CONSTANT FLOW EQUIPMENT



LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES

Air* Travels First Class

THROUGH SPIRATUBE

New flexible tubing — non-collapsible, retractable — *moves air, powdered, granular or other light solids anywhere, easier, with minimum resistance to flow because it's uniquely spiral-stitched.

When you need tubing that is non-collapsible and retractable, add this specification — *spiral-stitching* — and make sure of utmost efficiency.

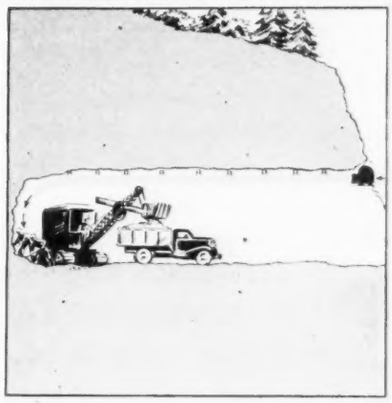
Spiral-stitching provides a smooth channel — no ridges inside to restrict passage, create eddies or collect dirt. It bends around corners with only the slightest reduction of free area.

There is no exposed metal, inside or out. The spring steel helix core is spiral-stitched *into* the fabric and the fabric is covered with tough, durable thermoplastic. Even the couplings are covered. SPIRATUBE is safe where sparking hazard would prohibit use of other tubing.

Check All Non-Collapsible Tubing Against These SPIRATUBE Features:

- No ridges inside tubing
- Bends at any point with only slight reduction in free air area
- Built-in coupling — no fittings needed
- Retracts to about ⅛th extended length
- Far lighter than metal ducts or moulded tubing
- Takes up least space when retracted
- Convenient stowage rack for one-man handling

TROUBLE-FREE VENTILATION



Warner SPIRATUBE* *REG. U. S. PAT. OFF.

Spiral-Stitched for Strength

SPIRATUBE efficiency was proved in active duty with the U. S. Navy. Available in 3" to 16" diameters and standard lengths up to 25 feet. Send coupon for specification folder. Address The Warner Brothers Company, SPIRATUBE DIVISION, Bridgeport 2, Conn. Branches: New York, Chicago, San Francisco, London.

Mail Coupon Today for more detailed information

The Warner Brothers Company
SPIRATUBE DIVISION
329-A Lafayette Street, Bridgeport 2, Conn.

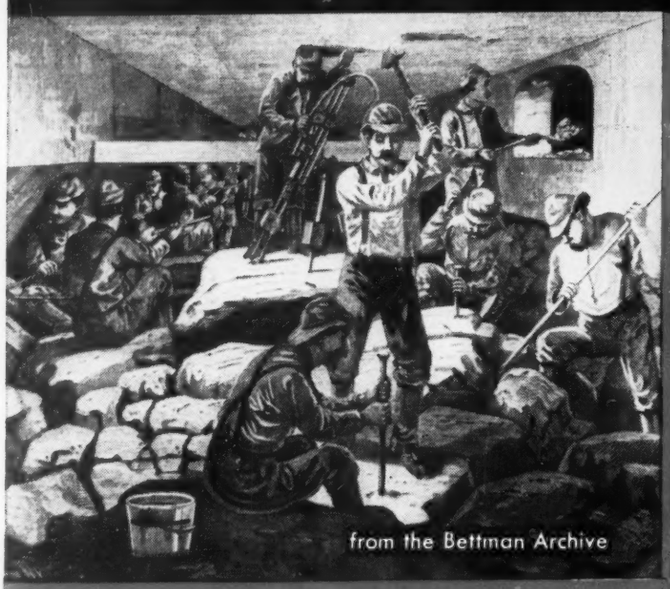
Gentlemen: I'm interested to learn more about SPIRATUBE. Please send specification folder.

Name.....

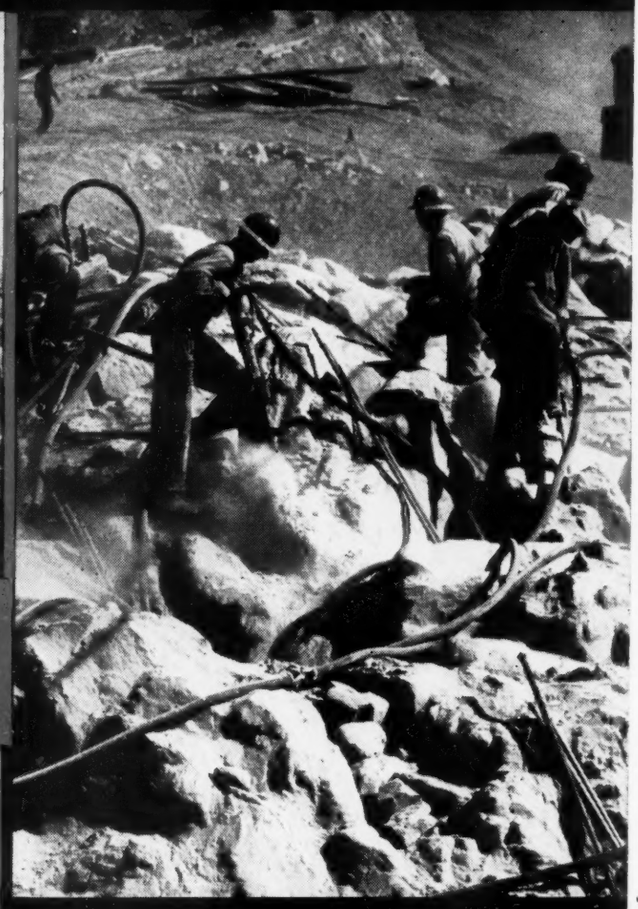
Company.....

Address.....

Thermoid —For Progress in Many American Industries



In 1870, before the introduction of labor-saving, time-saving, modern equipment, excavation work was tedious and slow.



A modern jack-hammer crew gets things done in a hurry with Thermoid Air Hose.

YOUR business may never use air hose. Nevertheless, it should interest you to know that Thermoid has developed air hose that stands up better against heat and oil . . . to pulsating pressure . . . to cuts and bruises . . . to the abrasion of being dragged over jagged rocks.

Thermoid's leadership in producing superior air hose is typical of Thermoid's leadership since 1880, in the design and manufacture of *all kinds* of hose and belting for power transmission and materials handling. Consultation with a Thermoid representative may develop ways to help you improve processes and reduce costs. *It's good business to do business with Thermoid.*

THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.

Thermoid Rubber
DIVISION OF THERMOID COMPANY
TRENTON 6, NEW JERSEY

Contributor to Industrial Advancement Since 1880

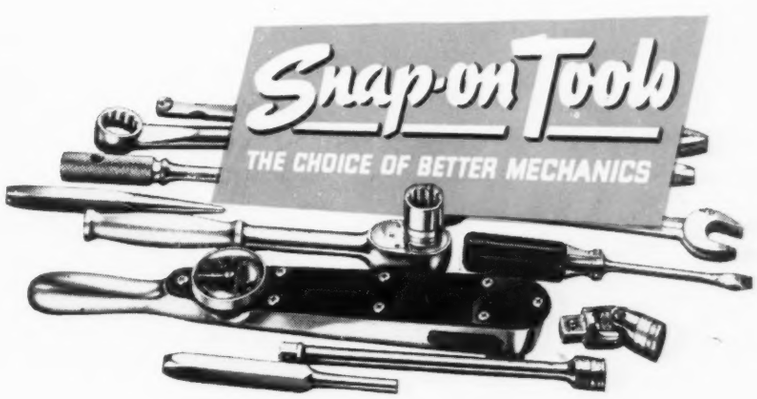
—THE NAME THAT SAYS "QUALITY" ON 3,000 TOOLS

To a vast army of skilled mechanics the brief phrase, "It's a Snap-on", sums up all they care to know of tool quality. Better tools mean added earning power, and they know that the Snap-on name on any tool pays off in speed and accuracy, in dependability and durability. Not only are Snap-on tools "the choice of better mechanics", but they are the choice of industry, widely used in every phase of production, assembly and maintenance. Write for catalog of 3,000 Snap-on tools.

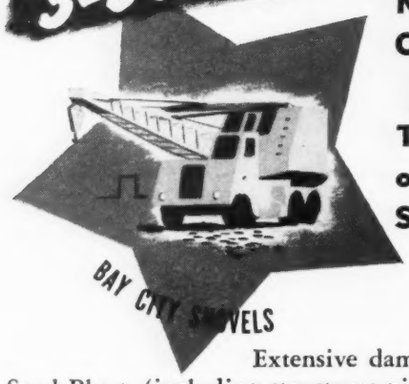
THIS UNIQUE, NATION-WIDE ORGANIZATION SERVES TOOL USERS EVERYWHERE

Snap-on's own distributing organization provides direct, personal service to tool users throughout America. Snap-on's branch offices and warehouses in 38 principal cities cover all major industrial areas. From factory branches a force of trained tool specialists bring Snap-on tools and service right to the work bench in shops and factories. The helpfulness and efficiency of this 25-year old service have won the endorsement of tool users everywhere. Write today for catalog and address of nearest factory branch.

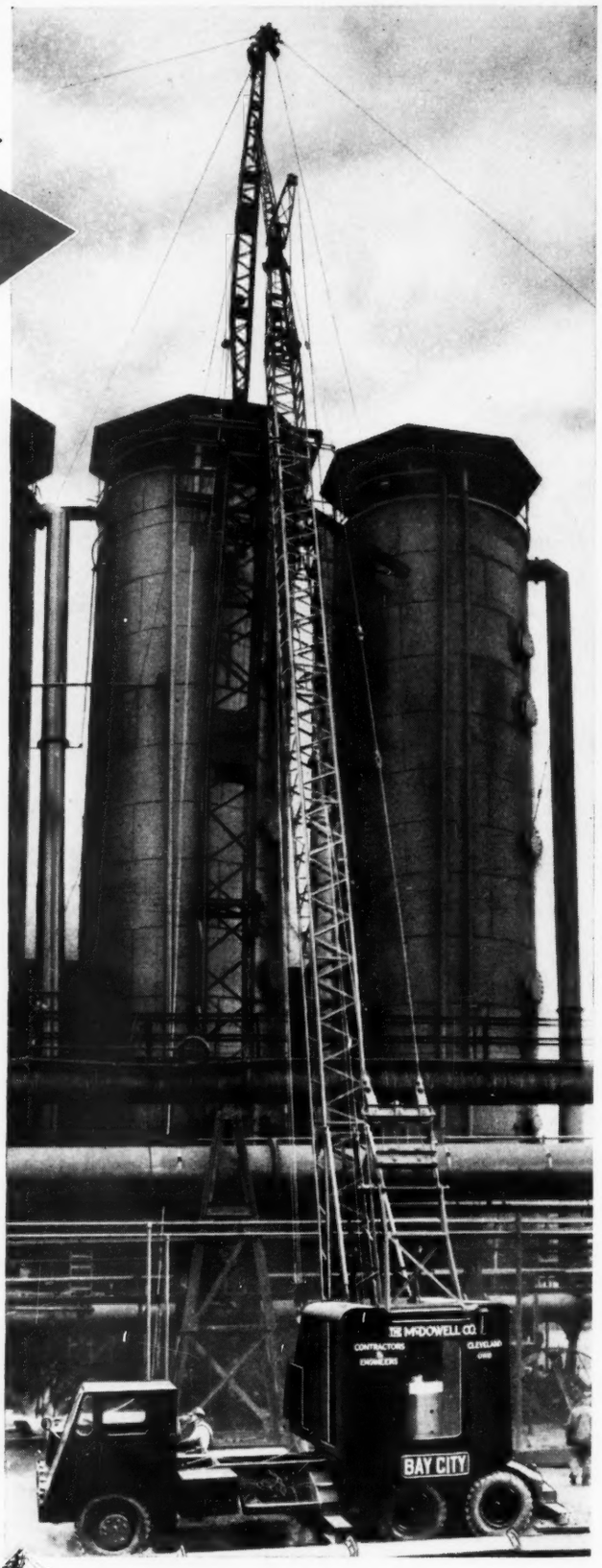
SNAP-ON TOOLS CORPORATION
8084-B 28th Avenue Kenosha, Wisconsin



3-STAR TEAMWORK

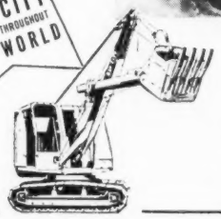


McDowell Co. Chooses BAY CITY CRANEMOBILE To Speed Repair on a Midwestern Steel Plant



Extensive damage to a Midwestern Steel Plant, (including structures pictured), threatened to slacken war-vital steel production, but reconstruction proceeded with minimum delay despite the 1945 winter weather. The repair job was awarded to The McDowell Company, contractors and engineers, steel erectors, millwrights, blast furnace and mill facility maintenance experts of Cleveland, Ohio. And to lift and swing heavy loads high with sure, swift ease, McDowell chose a 20-Ton Model 18S BAY CITY CraneMobile. 95 ft. boom with 30 ft. jib brought the topmost portion of tanks within easy reach. Here, as in all BAY CITY equipment, rugged construction assured dependable, low-cost performance—fine BAY CITY engineering insured perfect balance and positive stability under capacity loads, CraneMobile mobility speeded and simplified dismantling and re-erection operation. Follow the leaders!—Choose CraneMobile for your material handling where speed, power, mobility, and easy operation count. See your nearest BAY CITY dealer or write BAY CITY SHOVELS INC., Bay City, Michigan.

AMERICA'S FINEST BUILT IN BAY CITY AND USED THROUGHOUT THE WORLD

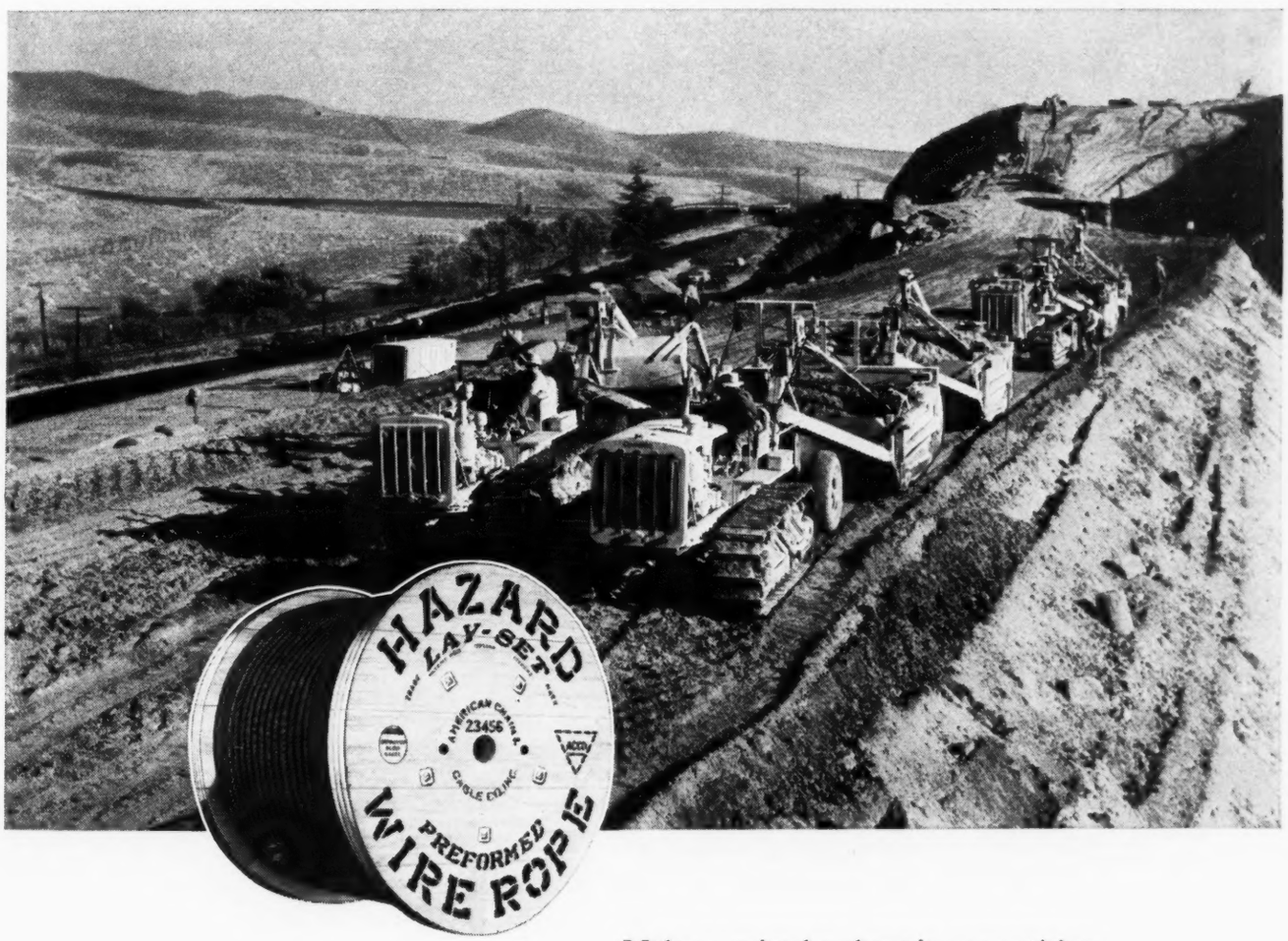


BAY CITY

SHOVELS • DRAGLINES
CRANES • HOES • CLAMSHELLS

SEE YOUR NEAREST DEALER for Bay City excavating and material handling equipment in sizes from ⅜ to 1¼ yards having crane rating up to 20 tons. Both crawler and pneumatic tire mounting.

Get your equipment ready for the huge A.R.B.A. *road-building program*



Make no mistake about it, competition during 1946 is going to be tough. With costs higher all along the line, profits will depend upon operating efficiency. With the A.R.B.A. road and airport building program starting this spring, see to it *now* that your equipment is in tip-top condition. And for long wear with steady production equip your machines with Hazard LAY-SET Preformed Wire Rope. There is no better, safer, more uniform wire rope than Hazard LAY-SET Preformed made of Improved Plow Steel.

ARMY E NAVY

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

TRADE MARK

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

Red Lead is
ALWAYS Pb_3O_4... *that's why*
it's a Dependable Metal Paint

Industry has yet to discover a better metal protective paint than Red Lead. This is due to inherent fundamental properties of the pigment itself.

Among the most important of these are Red Lead's definite chemical composition and its purity, as distinguished from pigments that have indefinite composition or vary from batch to batch, with resulting possibility of variation in performance.

The reason for this uniformity is that red lead is a simple chemical compound—a combination of only two elements, oxygen and high-purity metallic lead. It is also an extremely pure compound, containing no corrosion accelerating impurities such as water-soluble chlorides or sulfates.

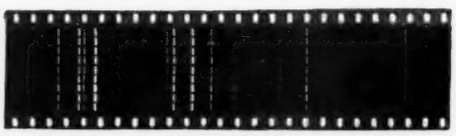
Uniform performance means predictable chemical behavior—dependable performance as a rust-inhibitive paint, day after day, job after job.

Furthermore Red Lead has the property of controlling acid conditions recognized as accelerators of rust. In the presence of various acids, Red Lead forms insoluble lead salts, at the approximate rate at which the acids are supplied. This is true whether the acids originate from acid forming environments, such as gas, smoke, and moisture in the atmosphere, or from the oxidation of the paint vehicle.

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including all the fast drying resins.

Specify RED LEAD
for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better paint for surface protection of metal if it contains Red Lead.



***These spectograms** show the high degree of uniformity and purity of nine different batches of Red Lead. Each spectrum is a practical duplicate of every other. Such uniformity is an important reason for Red Lead's outstanding performance.*

* * *

Write for New Booklet — "*Red Lead in Corrosion Resistant Paints*" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas. If you haven't received your copy, address nearest branch listed below.

* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

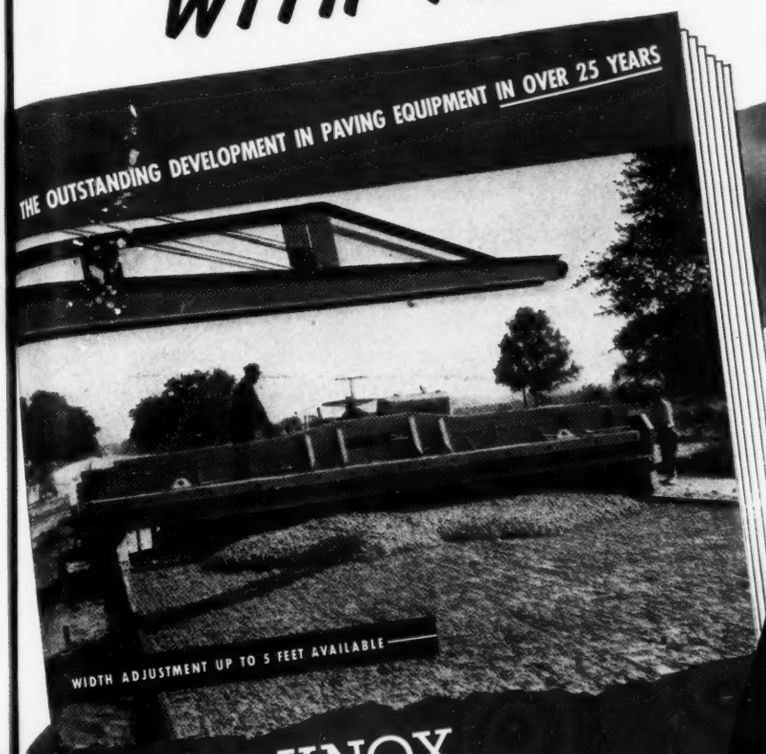
NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National Lead Co. of Mass.); Philadelphia 7 (John T. Lewis & Bros. Co.); Pittsburgh 30 (National Lead Co. of Pa.); Charleston 25, W. Va. (Evans Lead Division).

Dutch Boy
Red Lead

GET BLUE RIBBON PRODUCTION WITH THIS PAVING TEAM

CONCRETE SPREADERS

FINISHING MACHINES



BLAW-KNOX

CONCRETE PAVING SPREADER

AUTOMATIC TRANSVERSE [illegible] TYPE

FOR ROADS AND [illegible]

[illegible] TALOG

BLAW-KNOX DIVISION, BLAW-KNOX COMPANY, PITTS[illegible]

ASK FOR THESE TWO BOOKS—THEY TELL THE WHOLE STORY

HERE— in print and ready for men interested in getting jobs done fast—complete information about the finest paving combination you can put behind paving mixers.

Know all about

BLAW-KNOX Transverse Blade CONCRETE SPREADERS
(Send for Catalog No. 2046)

and

BLAW-KNOX CONCRETE FINISHING MACHINES
(Send for Catalog No. 2045)

These machines, and the complete line of Blaw-Knox Construction Equipment, are the answers to faster construction and profitable paving.

Your nearest Blaw-Knox dealer knows the capacity of this equipment for **blue ribbon performance.** Ask him.

Representatives in Principal Cities

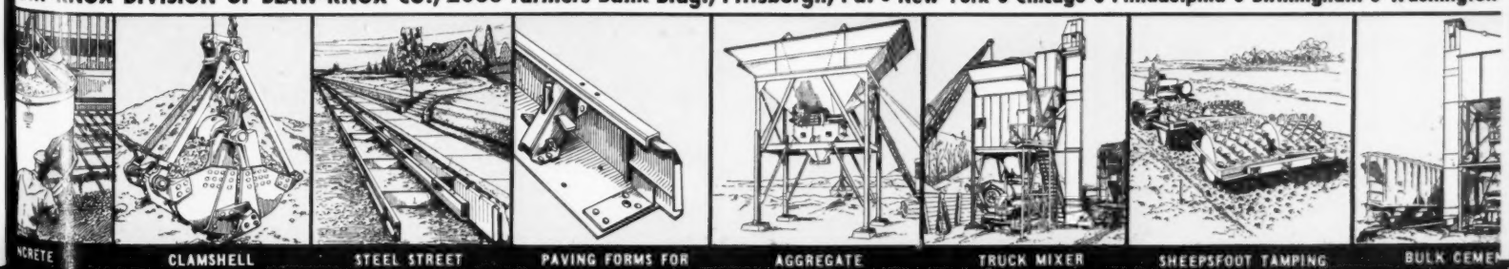
BLAW-KNOX

FINISHING MACHINE

FOR ROADS AND AIRPORTS

BLAW-KNOX CONSTRUCTION EQUIPMENT

BLAW-KNOX DIVISION OF BLAW-KNOX CO., 2086 Farmers Bank Bldg., Pittsburgh, Pa. • New York • Chicago • Philadelphia • Birmingham • Washington



You'll need these in the years ahead

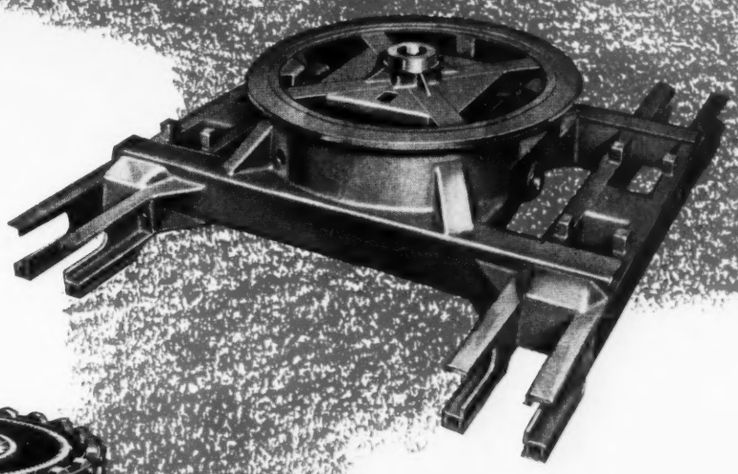
It takes a lot of advantages designed into *one* machine to cut your over-all digging costs. And you'll find more of them in a P&H than any other excavator. They'll give you easier operation, greater yardages, greater maneuverability, less trouble, fewer repair bills. You'll need these advantages more than ever in the years ahead.

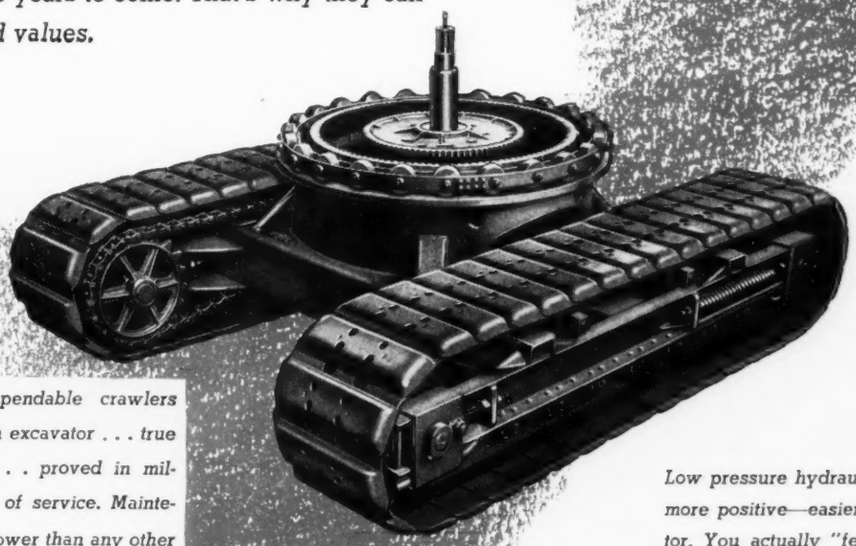
See a P&H at work. Write or phone us for the location of the one nearest to you — or write for complete illustrated bulletin on the size that interests you.

P&H

P&H ADDED VALUES

Your excavator dollars buy more when you buy P&H. Whether you are looking for more rugged construction, easier operation, more reliable travel or lower maintenance costs . . . you'll find them — and more — in P&H's work-tested features. And you, like other P&H users, will find these advantages paying off again and again in the years to come. That's why they call them *added values.*

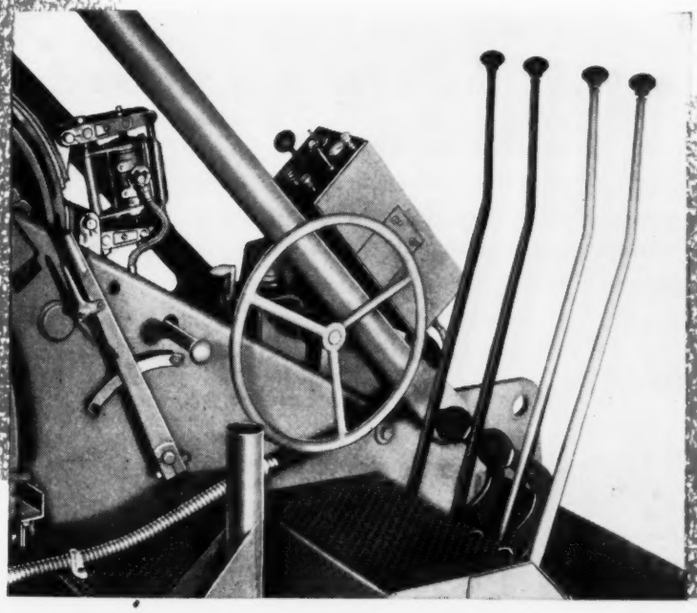




Carbody and crawler frames are welded into one rigid, rugged unit—"weaveproof" construction. Upper, including side stands, is also welded into a one-piece unit of rolled high strength steels.

The most dependable crawlers ever put on an excavator . . . true tractor type . . . proved in millions of miles of service. Maintenance cost is lower than any other type.

Low pressure hydraulic control is smoother, faster, more positive—easier on both machine and operator. You actually "feel" the load at every move, control it better.



Now is the time to look into these and all the other added values P&H gives you. See your nearest P&H representative.

P&H

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

General Offices: 4494 West National Avenue
Milwaukee 14, Wisconsin

P&H excavators are built in sizes from ½ to 6 cubic yards capacity; gasoline, Diesel or electric powered.

"They say it's the best way to reach hard-to-get-to places!"

And they're right! For with Rex Pumpcrete, *the pump that pumps concrete through a pipe line,* you can reach places difficult to get to with ordinary concrete-placing methods . . . without expensive preparatory work.

Pumpcrete transports on one or more levels . . . elevates or lowers and distributes concrete in one operation, advances construction schedules and usually cuts concreting costs on many types of jobs.

Check your next job to see whether or not it's a Pumpcrete job. And send for your copy of Bulletin No. 466 that contains the facts about *concrete by pipe line.* See your local Rex Distributor or send direct to Chain Belt Company, 1664 W. Bruce St., Milwaukee 4, Wisconsin.

CHAIN BELT COMPANY *of* MILWAUKEE

REX

CONSTRUCTION MACHINERY

Built like a Shock Absorber

TO STOP TIRE DAMAGE FROM TOUGH SERVICE!

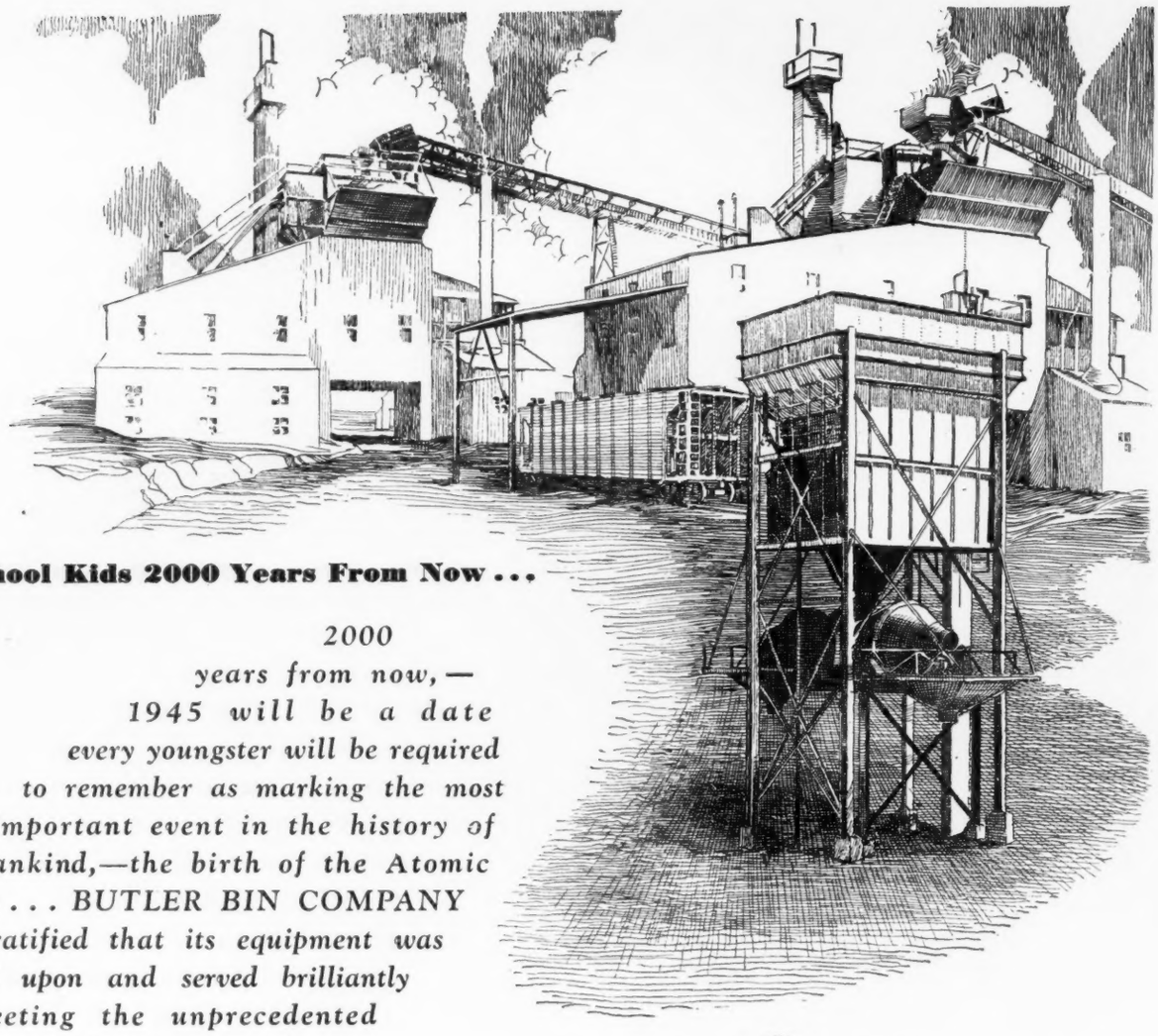
● General Off-the-Road Tires are built to *absorb* the heavy shocks and impacts of punishing service . . . built specifically to eliminate tire failure from service damage.

General calls it "shock-absorber" construction—a method of placing a thick, resilient layer of rubber directly under the tread and shoulders to absorb and distribute shock where greatest concentrations occur. Diminishing thicknesses are "sandwiched" between plies . . . bonding the whole into a flexible, shock-absorbing carcass that drastically reduces damage-failures . . . delivers more *original* service . . . more *recap* service.

Exclusive shock-absorber construction and unchallenged Top-Quality makes General Off-the-Road Tires your *one best* choice to get tire performance that pays dividends in savings.

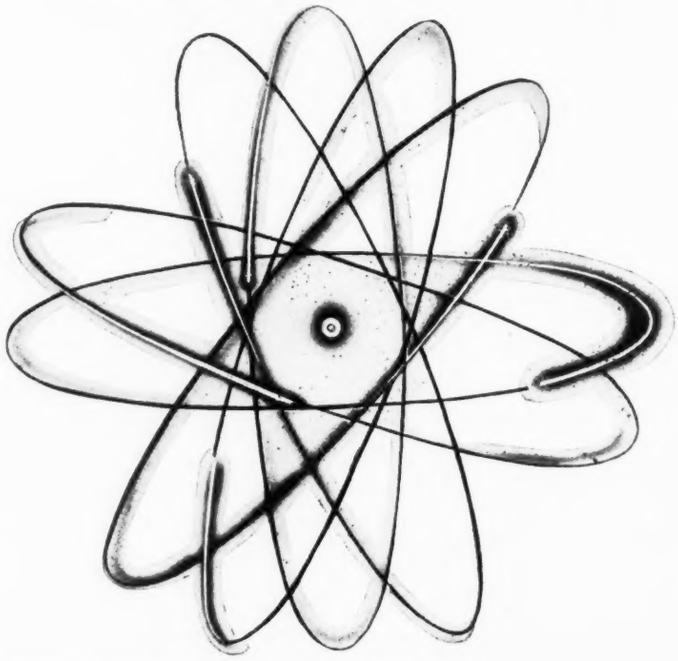
THE GENERAL TIRE & RUBBER COMPANY • AKRON, OHIO

GENERAL OFF-THE-ROAD TIRES



School Kids 2000 Years From Now . . .

2000 years from now,— 1945 will be a date every youngster will be required to remember as marking the most important event in the history of mankind,—the birth of the Atomic Age . . . BUTLER BIN COMPANY is gratified that its equipment was called upon and served brilliantly in meeting the unprecedented production demands incident to the construction of the gigantic atomic bomb factories.



Concrete mixing plants at
Oak Ridge, Tennessee
Clinton, Tennessee
Pasco, Washington

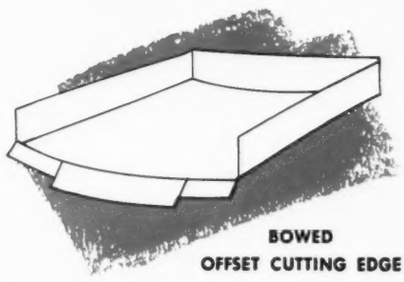
by

BUTLER BIN COMPANY

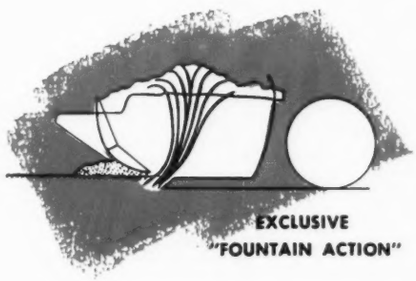
WAUKESHA, WISCONSIN

bigger pay loads are a cinch with . . .

the new LPC *Carrimor**



BOWED
OFFSET CUTTING EDGE



EXCLUSIVE
"FOUNTAIN ACTION"

Yes, Sir! You get bigger "pay loads" every time with an LPC "Carrimor". Moreover, you get them faster and with less power! Here's why: The "floating" front apron provides a generous initial opening for loading, without any movement of the tail gate. The bowed offset cutting edge gives you instant penetration in all kinds of material. The earth "fountains" up toward the center of the bowl until a full heaped load is obtained. Even in very loose material you can get full loads with amazing ease because LPC's exclusive, eccentric hoist sheaves produce a greatly accelerated downward throw in favor of the cutting edge, creating a "pumping" action that forces the load up into the bowl.

In addition to these features there are dozens of others that will cut minutes off your loading, hauling and dumping time while adding yardage to your pay loads. Compare the new LPC "Carrimors" with any other scraper you've ever used and you'll see why so many agree on LPC for lowest possible cost per yard. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; Oakland, Calif.

**Trade Mark Registered*

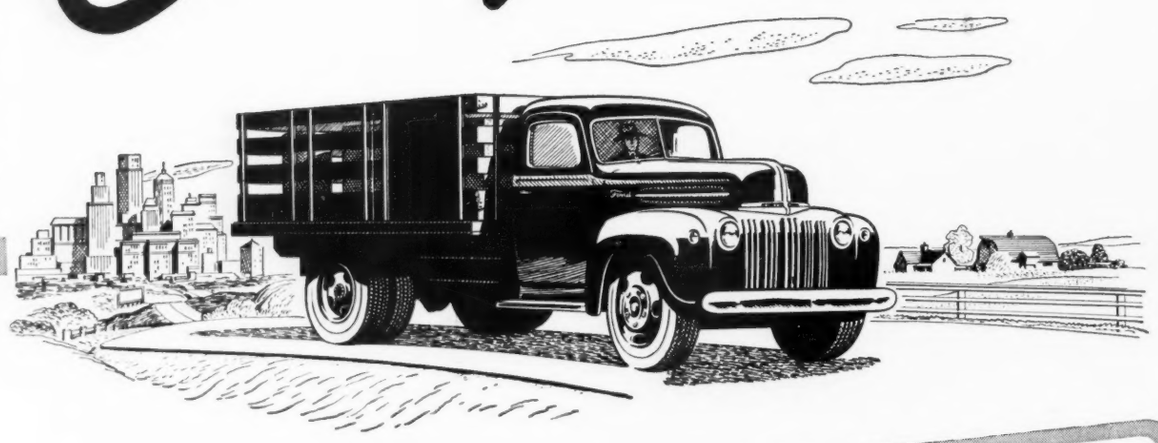
LaPLANT-CHOATE

Engineered Earthmoving

Lowest Possible Cost per yard

Ford

FORD TRUCKS Everywhere!



✓ 32 IMPORTANT New ENGINEERING ADVANCEMENTS

•

✓ 51 BODY AND CHASSIS COMBINATIONS

•

✓ TWO GREAT FORD ENGINES— THE 100 H.P. V-8 and the 90 H.P. SIX

because of

LOW INITIAL COST

LOW OPERATING COST

LOW MAINTENANCE COST

Availability of Service and Parts— Everywhere, Quickly

SEE YOUR FRIENDLY FORD DEALER

THIS MULTIFOOTE 34-E

traveled 120 miles in one season

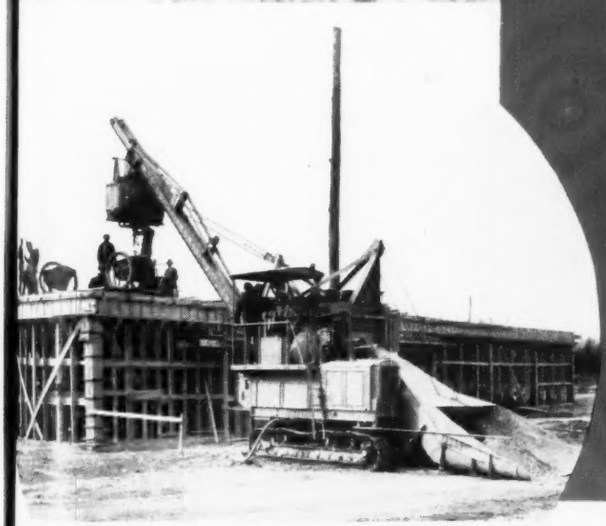
120 Miles traveled during the 1945 season! That's the record hung up by one of the MultiFoote 34-E's owned by the Bontrager Construction Company, Elkhart, Indiana.

Think what 120 miles traveled on paving jobs means in terms of paver dependability and profit possibilities on your contracts! This is ***working*** mileage with a machine that can handle the heaviest paving schedules, season after season, at lowest operating and maintenance costs and without expensive delays for overhaul and repairs.

Let's take a closer look at the rugged, simple Multi-Foote traveling mechanism: The drive is from the single, special chrome molybdenum steel main shaft. Gears are fully enclosed and run in oil... giving two speeds—forward and reverse. Crawlers are long and wide for low ground bearing pressure, and are tapered at discharge end for plenty of bucket clearance when boom is swung. Crawler rollers are solid chilled steel—on 3-inch, high-carbon steel shafts that are mounted directly in the crawler side frame to provide maximum strength and simplicity. Extra-strength treads wear longer, will not "dish in."

Add the many other MultiFoote advantages that have put more of them on the world's jobs than any other paver, and you have the ideal machine for a big-profit 1946. Call or write your MultiFoote distributor for complete information.

THE FOOTE COMPANY, Inc., 1910 State St., Nunda, N.Y.



MultiFoote Elevating Boom

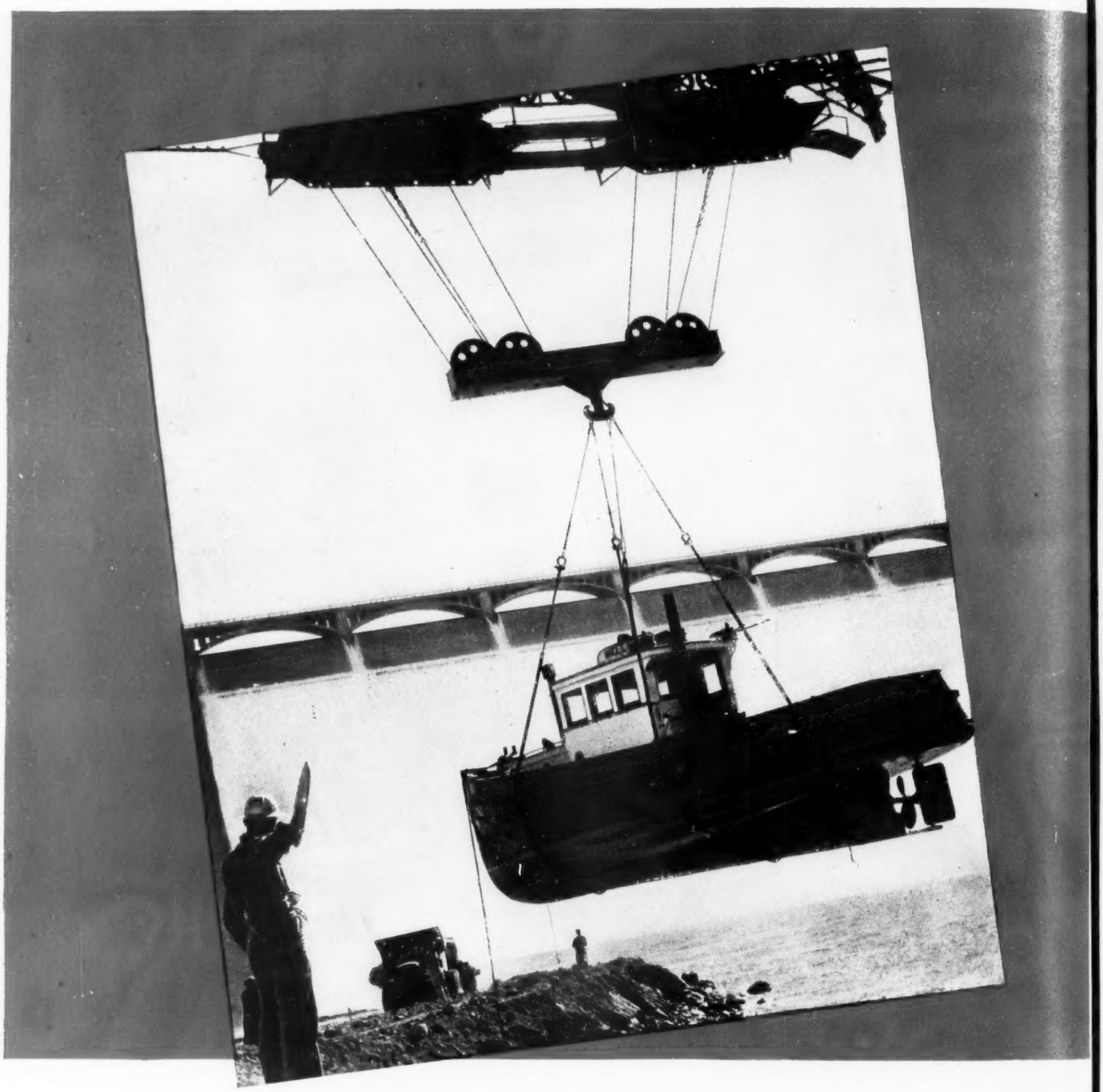
With the MultiFoote Elevating Boom, you can put full loads 18 feet above ground level—get those building and construction jobs that mean extra profits with your MultiFoote 34-E.

MULTIFOOTE

CONCRETE PAVERS

Three Army-Navy "E" Awards for The Foote Company!

PROTECT



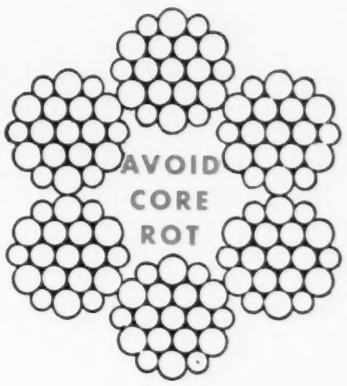
TEXACO

TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHTS

WIRE ROPE

KEEP IT FLEXIBLE



REDUCE WEAR

ROPE protected by *Texaco Crater* won't die young. This world-famous lubricant reduces the friction and wear of rapid flexing over sheaves. It prevents corrosion from weather or mine water. It preserves the core and keeps the rope flexible. In short, *Texaco Crater* keeps rope strong longer.

Texaco Crater has been preferred by operators everywhere for more than 30 years. It keeps its excellent protective qualities even in the presence of dust, dirt and abrasives.

Use *Texaco Crater* on open gears, too. It cushions load shocks, quiets noise, reduces wear.

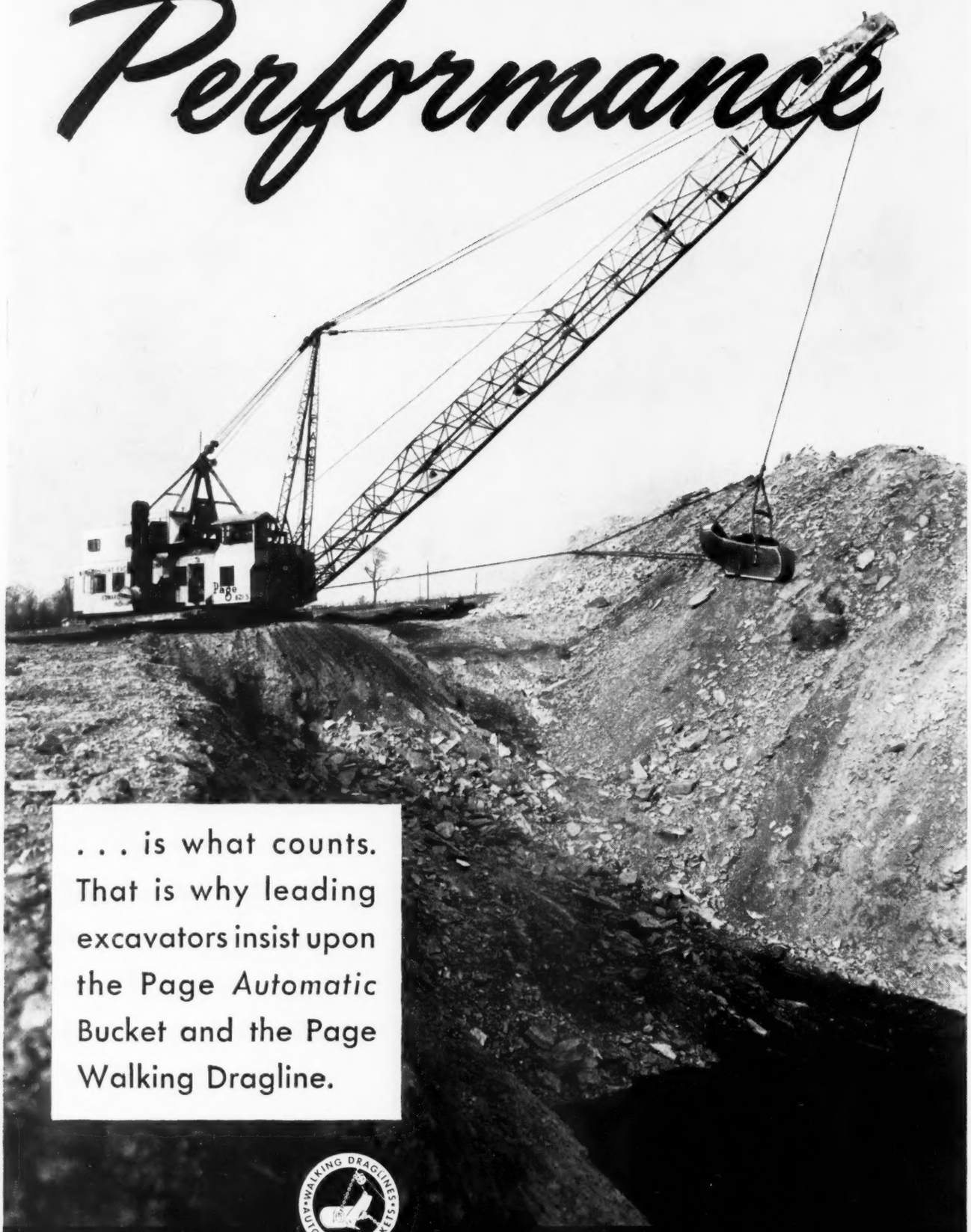
Let a Texaco Lubrication Engineer assist you in making your rope last longer. Just call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS

Performance



. . . is what counts. That is why leading excavators insist upon the Page *Automatic* Bucket and the Page Walking Dragline.

WALKING DRAGLINES • AUTOMATIC BUCKETS

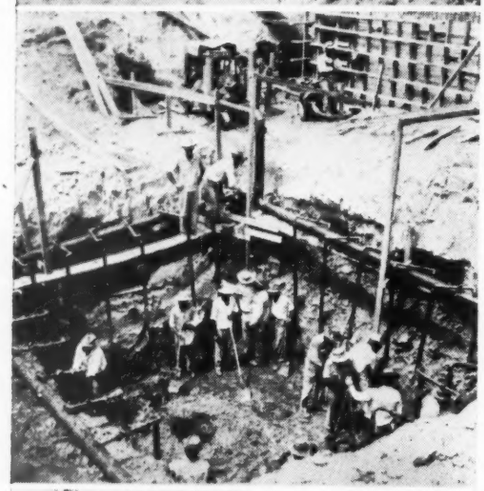
PAGE ENGINEERING COMPANY
CHICAGO 38, ILLINOIS

Yes Sir! "More features than a cactus has needles", well describes the many advantages of the Huber Rollers. Your nearest Huber Dealer will gladly furnish you with information about these features.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER ROLLERS

3 WHEEL and TANDEM • *All Sizes* • GAS or DIESEL



What Do You KNOW About WELLPOINTS?

DO YOU BELIEVE THAT

1. **THEY'RE ALL ALIKE?**
2. **THEY WON'T WORK EXCEPT IN SANDY SOILS?**
3. **THEY CAN'T BE USED TO HANDLE LARGE VOLUMES OF WATER?**
4. **THEY'RE TOO EXPENSIVE FOR THE AVERAGE JOB?**

IF YOU DO, THEN YOU OWE IT TO YOURSELF TO GET ACQUAINTED WITH A MORETRENCH WELLPOINT SYSTEM!

FIRST

Send for our catalog—it has facts and photos on the actual use of wellpoints in this and foreign countries.

SECOND

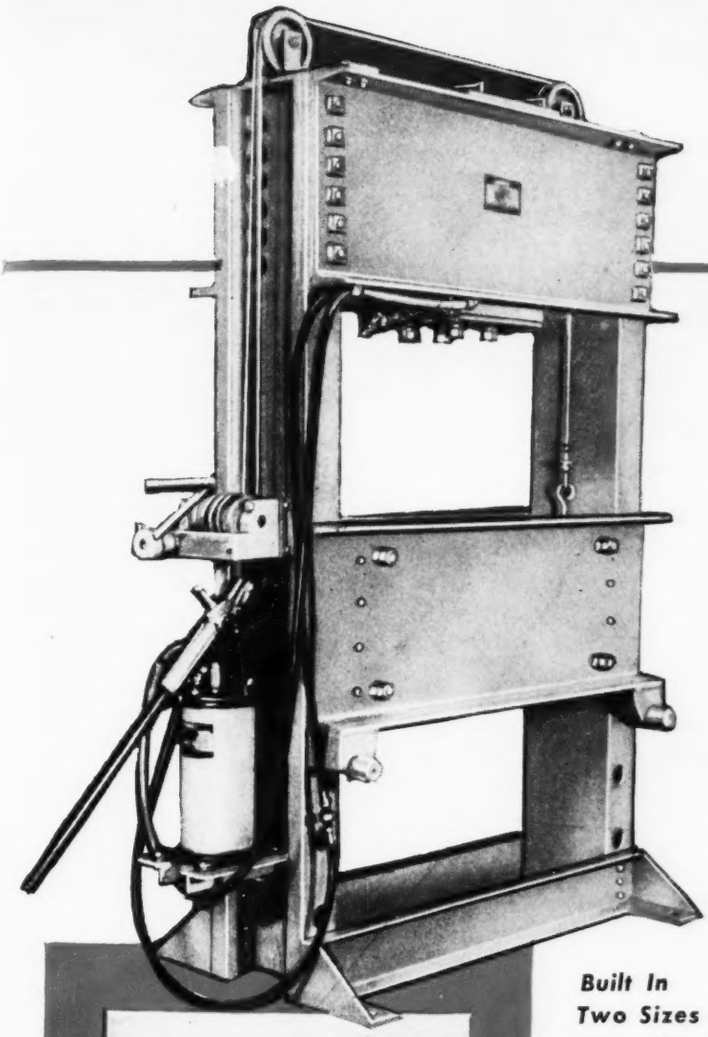
Before you bid a wet job, get our estimate on digging it "in the dry".

Successful wellpoint operation is a combination of efficient equipment, trained personnel—and experience. MORETRENCH has all three. Use them to advantage on your next wet job!

MORETRENCH CORPORATION
90 WEST STREET NEW YORK 6, N. Y.

CHICAGO, ILL. • ROCKAWAY, N. J. • TAMPA, FLA.
NEW ORLEANS, LA. HOUSTON, TEX.

RODGERS *flexible* SHOP PRESSES



. . . the most useful tool you can have in the shop!

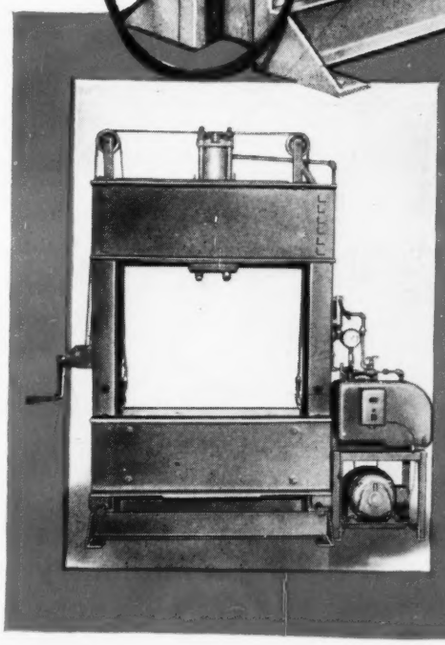
Do you have pressing, squeezing, pulling or forcing jobs around your shop? . . . little, or big, jobs that take time and trouble and special worrying to accomplish? You should have a Rodgers Shop Press—it's one of the most useful tools around *any* man's shop.

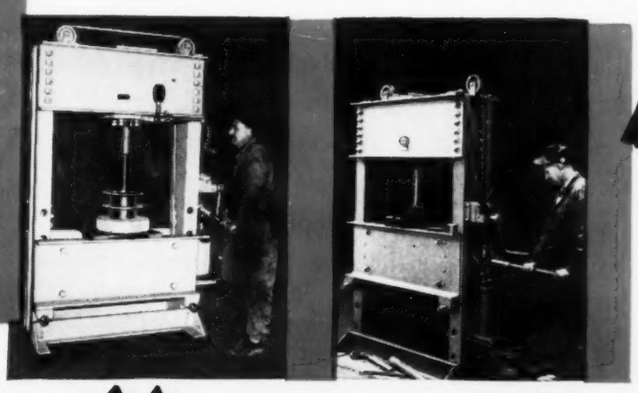
Here is why the Rodgers is such a versatile unit: it is simple and sturdy, yet so flexible that the opening between the top frame and bolster may be set from 4½" up to 32½" by adjusting the alloy steel pins upon which the bolster rests. A hand crank easily raises or lowers the bolster for adjustment. The cylinder may be mounted as shown, inside the press frame head, or hung below—and is adjustable across the entire width of the frame. Ram travel of the cylinder may be either 6½" or 13". When desirable, the press can be used resting on its side for more convenient handling of large pieces. Power is supplied by the powerful Rodgers 4-Speed Hand Pump, mounted on the press or separate, or by a Rodgers Power Pump Unit. Once you get a Rodgers, you'll say too . . . "it's one of the handiest tools in the shop."

Built In Two Sizes —

Above: 100-ton model with Rodgers Hand Pump.

Left: 150-ton model with a Rodgers 2 cyl. "D" Power Pump.





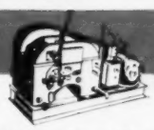
Write us today for *all* of the details . . . and our new catalog.

Rodgers Hydraulic, Inc.

hydraulic power equipment

Shop Presses

Crawler-Track Presses

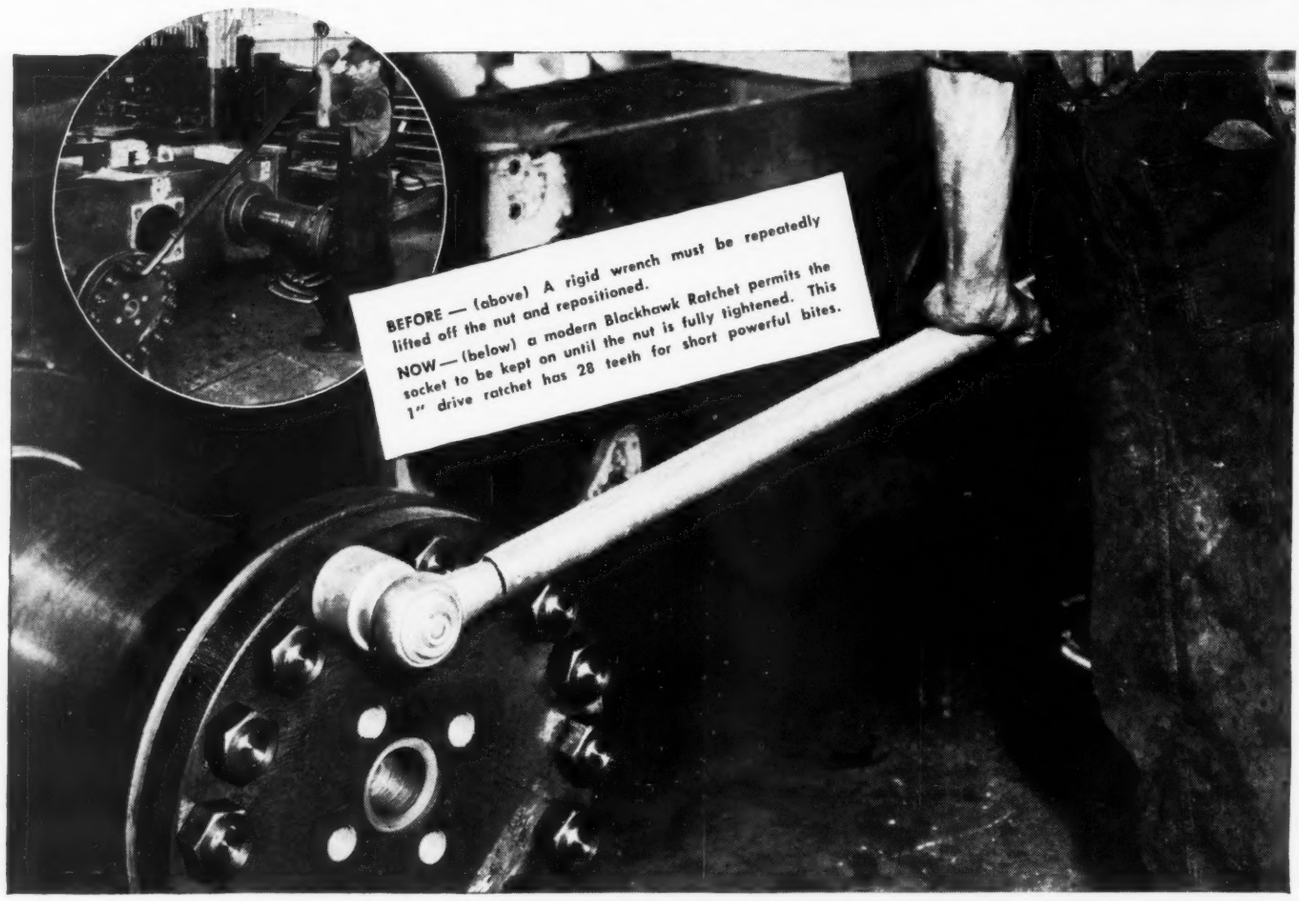


Power Pump Units

Portable Presses

7403 Walker St., St. Louis Park, Minneapolis 16, Minn.

Here's How Blackhawk Socket Wrenches
SAVE 2 HOURS A DAY on this Job


BEFORE — (above) A rigid wrench must be repeatedly lifted off the nut and repositioned.
NOW — (below) a modern Blackhawk Ratchet permits the socket to be kept on until the nut is fully tightened. This 1" drive ratchet has 28 teeth for short powerful bites.

BLACKHAWK'S EXCLUSIVE COMBINATION OF FEATURES SAVE YOU TIME AND MONEY

ONLY Blackhawk Wrenches combine all these features — sturdy, thin walls that let sockets squeeze into tight spots — clean, hot broached sockets for long life and less nut wear—patented thumb release Lock-On for *extra* safety—all the drives to serve the complete range of socket sizes—and a complete assortment of handles and accessories that build up into scores of combinations for *extra* utility. Ask your Blackhawk Industrial Supply Salesman for a Blackhawk wrench catalog — or write us.

A Product of BLACKHAWK MFG. CO., Dept. W2326 Milwaukee 1, Wis.

PATENTED "LOCK-ON" Saves Time, Temper & Machinery

A Blackhawk Socket and handle go together with a "click" that says they're really locked to stay — no danger of socket sticking in tight places or dropping off accidentally. Then, to disengage, the user just presses the "thumb release" button and pulls the combination apart.

Always Specify

BLACKHAWK SOCKET WRENCHES

AIR PLUS JAEGER COMPRESSOR

DON'T BUY AN OBSOLETE COMPRESSOR WHEN YOU CAN GET A JAEGER AIR-PLUS

There's at least 5 YEARS' DIFFERENCE between ordinary air compressors and the modern Jaeger "AIR PLUS" . . . Engineered as complete units to micro-precision standards unknown before the war, and powered with big Continental, Caterpillar and International engines of the latest type, these efficient machines deliver cooler, drier air with less fuel consumption than any compressor you have ever owned.

In design they are extremely simple and accessible. In operation they develop full efficiency at 20% to 30% slower piston speed than others, eliminating all usual vibration and increasing the life of both engine and compressor. Giant, air-animated valves, "ultra-lapped" to perfect seating closure, insure free flow and positive delivery of all the air and make frequent valve grinding or replacement a thing of the past.

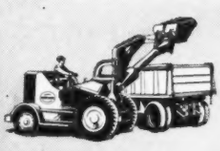
"AIR PLUS" Compressors are sold and ably serviced in 120 cities. Sizes 60 to 500 ft. Ask your Jaeger distributor or write us for Catalog JC-5.

You Get MORE FOR YOUR MONEY in a MODERN COMPRESSOR

- Air-cooled, 2-stage, vertical compressor—built in a balanced "W", full force-feed lubricated — 3 point suspension — interchangeable precision parts.
- 100% efficient intercooling, automatic drainage.
- Massive main frame with recessed fuel tank, 30% to 50% larger air receivers, bigger tool boxes, lifetime clutches, sectional radiators and intercoolers, electric starter, grouped controls, Timken bearing wheels, "Auto-Steer" axle, etc. all standard.

THE JAEGER MACHINE COMPANY, Columbus 16, Ohio

REGIONAL OFFICES: 8 E. 48th St. NEW YORK 17, N. Y. — 226 N. LaSalle St. CHICAGO 1, ILL. — 235-38 Martin Bldg. BIRMINGHAM 1, ALA.



"FLEET-FOOT" Loaders

"SPEEDLINE" Concrete Mixers

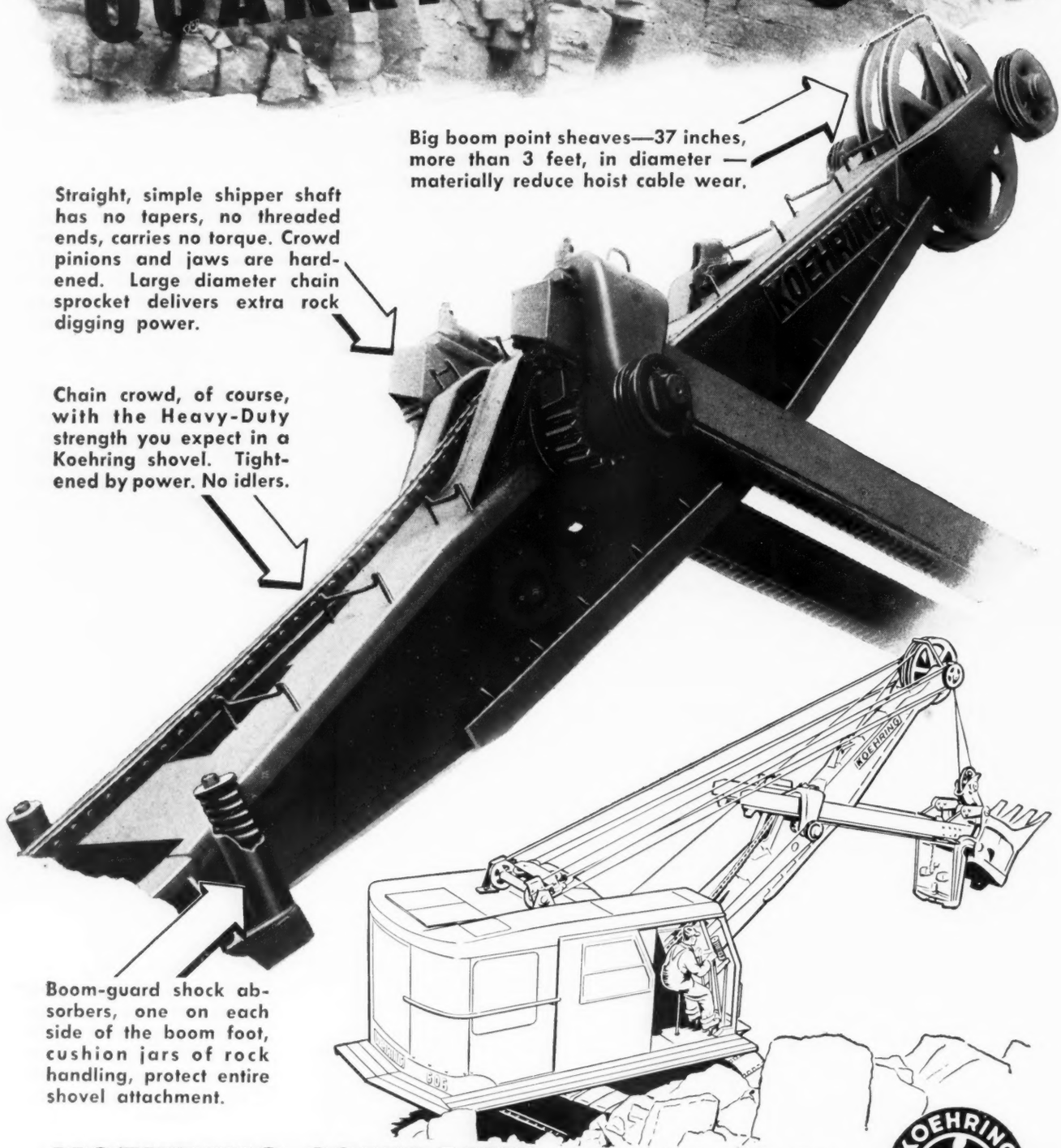
"SURE PRIME" Contractors Pumps

JAEGER *Engineered* **EQUIPMENT**

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

KOEHRING

SHOVEL BOOM FOR QUARRY-DUTY 605



Big boom point sheaves—37 inches, more than 3 feet, in diameter — materially reduce hoist cable wear.

Straight, simple shipper shaft has no tapers, no threaded ends, carries no torque. Crowd pinions and jaws are hardened. Large diameter chain sprocket delivers extra rock digging power.

Chain crowd, of course, with the Heavy-Duty strength you expect in a Koehring shovel. Tightened by power. No idlers.

Boom-guard shock absorbers, one on each side of the boom foot, cushion jars of rock handling, protect entire shovel attachment.

KOEHRING COMPANY, *Milwaukee 10, Wis.*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

STURDIEST* PER POUND WEIGHT...

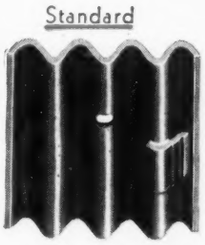
Caine CORR-PLATE Steel Piling

1528

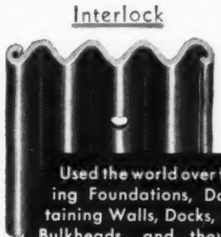
EASY TO DRIVE UNDER LOW HEADROOM

The standard section of Caine Corr-Plate Piling hooks in from the side . . . as illustrated. It is not necessary to raise the piling high in the air to insert it from the top. And because there is no surplus weight, it is easier to handle and set, easier to drive.

Standard



Interlock



Used the world over for building Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, and thousands of other construction jobs, Sewers and Disposal Plants.

* NO SURPLUS WEIGHT

There's no "lazy metal" in Corr-Plate Steel Piling. Every pound of steel carries its part of the load.

That's why it's lighter *than any other piling of equal strength* . . . and that gives Caine Corr-Plate Steel Piling unmatched advantages when working *under low headroom.*

Let our experienced Engineers study your piling requirements and make suggestions.

Investigate NOW

these and many other time-proven reasons why THOUSANDS OF ENGINEERS AND CONTRACTORS SWEAR BY "CAINE CORR-PLATE"

1. Easier to transport. (Nestable)
2. Easier to handle and set.
3. Easier to drive.
4. Easier to pull without distortion.
5. Easier to use over and over again.
6. Easier to set under existing structures.

Write for FREE Catalog

CAINE *Steel Company*

STEEL PILING DIVISION
1820 N. Central Avenue
CHICAGO 39, ILLINOIS

TOURNATRAILERS AT

demonstrate ability

Big single tires, 2-wheel Tournapull design give flotation and traction to haul across difficult sand conditions.

Tournatrailer's positive controlled rear dump piles or spreads material clear of tires.

Gull-DeFelice work

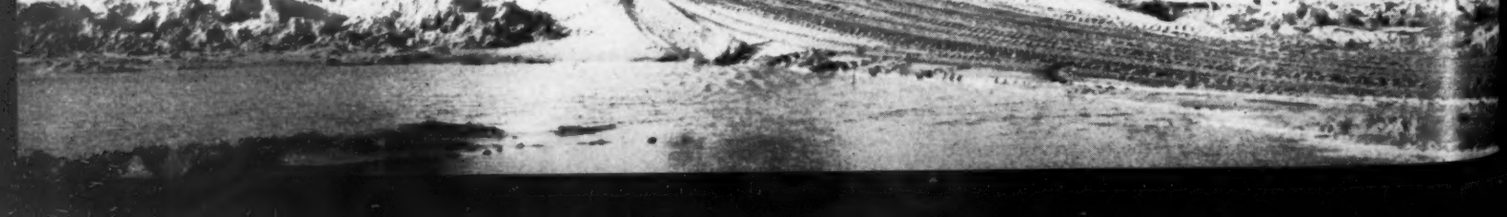
TOURNATRAILERS in tough going through sand, muck, and sea water

Twelve Tournatrailers are included in fleet of 21 Tournapull rigs used at Idlewild by Gull Contracting Co. Inc. and L. G. DeFelice & Son, Inc. Job involves removing muck from taxistrips and apron areas and replacing it with sand. Material removed is about 20% muck mixed with dredged sand saturated with salt water, which often stands deep in the 6' cuts.

Tournatrailers are loaded by a 1½ yard shovel or a 1½ yard dragline in two minutes. Tournatrailers' big top opening speeds loading for each unit, is especially important for the dragline, enabling it to equal shovel production of loaded material. Backing in and unloading on dump takes 1½ minutes. Overall cycle on 1-mile round-trip haul averages from 12 to 15 minutes. Road includes several bad spots and 1000' of especially soft going requiring travel in second gear.

Occasional pockets of clean sand are spread in the apron area on a 1400' cycle. Dumping on the fly the Tournatrailers make these shorter hauls in 4 to 4½ minutes round trip, although soft sand haul roads require third and sometimes second gear for the entire 700' haul with empties coming back in high.

Gull-DeFelice officials figure Tournatrailers take out from 11 to 12 pay yards per trip, average 30 trips each on one-mile haul in nine-hour shift plus some uncounted extra trips with the good material into apron area.



IDLEWILD AIRPORT

to outperform all other haul units

Wide top opening gives easy target; low boo
speeds loading time; big capacity eliminat
extra spotting required with smaller hauling unit

Tulley & DiNapoli, Inc.

find TOURNATRAILERS haul 4 trips to 3 for their dump trucks

With 160,000 yards of garbage-fill material at Idlewild to load and haul into a swamp area, Tulley & DiNapoli pulled three Tournapulls off a coal handling job for a big power plant to increase hauling production at Idlewild. LeTourneau Carryall Scrapers were disconnected and Tournapull prime movers were hitched to Tournatrailers. The 17 heaped yard Tournatrailers then moved in to work with their fleet of heavy-duty 10-yard dump-trucks.

Loading with 1½-yard shovel, nine passes heap the big Tournatrailer bodies which get away in an average of 1¾ minutes. The partly decomposed garbage is soft, gives 50% compaction on the dump. Haul road is over filled material and swampy ground so you can appreciate the tough hauling conditions.

Haul is a quarter mile one way. Tournatrailers, with their big, single, low pressure tires average better than 4 trips to 3 for the smaller-capacity dump-trucks. On a 900-foot bad spot in the haul road, dump-trucks must go into low; Tournatrailers pull through easily in second.

Tournapull interchangeability insures future earning capacity. When work at Idlewild is finished, Tulley-DiNapoli will reconvert Tournatrailers to Tournapull-Scraper units for coal handling at the power plant.

Visit Idlewild . . . see for yourself

So far 41 Tournapulls have been used at Idlewild . . . have handled approximately 90% of material hauled on this tough job. It's worth seeing . . . visit the Idlewild operations . . . see for yourself what job-proved LeTourneau rubber-tired rigs can do for you . . . or ask your local LeTourneau distributor for Tournapull facts and figures TODAY!

C44

LETOURNEAU

PEORIA, ILLINOIS . STOCKTON, CALIFORNIA

Tournapull, Tournatrailer, Carryall . . . Trade Mark Reg. U.S. Pat. Off.

QUICK QUIZ

FOR

Cost Conscious Contractors

1 *What steel foundation pile is noted for its exclusive FLUTED, TAPERED design that makes driving with average job equipment possible and profitable?*

2 *What steel foundation pile has a special EXTENDIBLE feature permitting quick and simple field extensions with either uniform or tapered sections?*

3 *What steel foundation pile combines these two cost-cutting, labor-saving benefits with a HOLLOW, TUBULAR construction that makes top-to-toe inspection quick and thorough?*

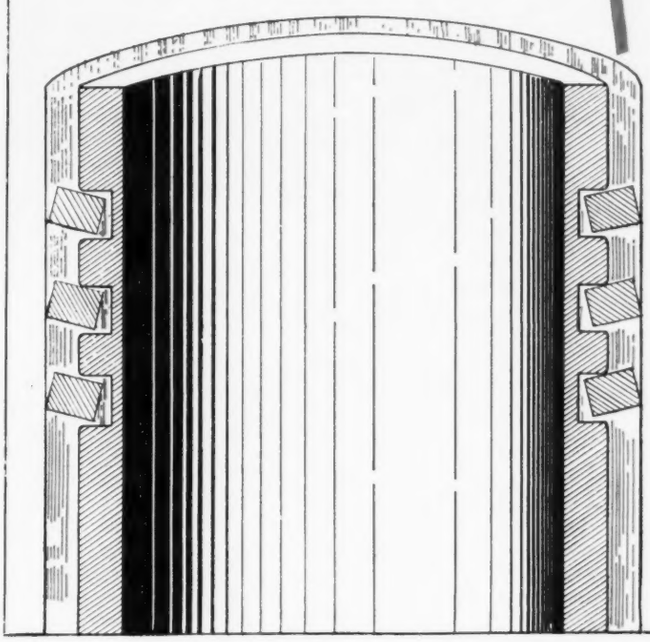
THE RIGHT ANSWER

Monotubes... enthusiastically favored by job experienced engineers and contractors for cast-in-place foundations for buildings, bridges, airports, highways and marine construction. Available in gauge, size and taper to meet requirements of varying soil conditions. For catalog or engineering aid, write The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Tapered Piles

Diesel Engine DANGER points



"ROCKING" PISTON RINGS SCORE LINERS

"Rocking" piston rings, the result of excessive wear in the ring grooves of Diesel engine pistons, are the source of considerable lay-off time and expense to Diesel operators—Wear-enlarged grooves permit rings to rock, and "bite" into cylinder walls. The result is usually a costly overhaul to replace not only pistons, but worn liners as well. It's a danger point in many Diesels—but "rocking" rings and their cause, enlarged ring grooves, can be minimized.

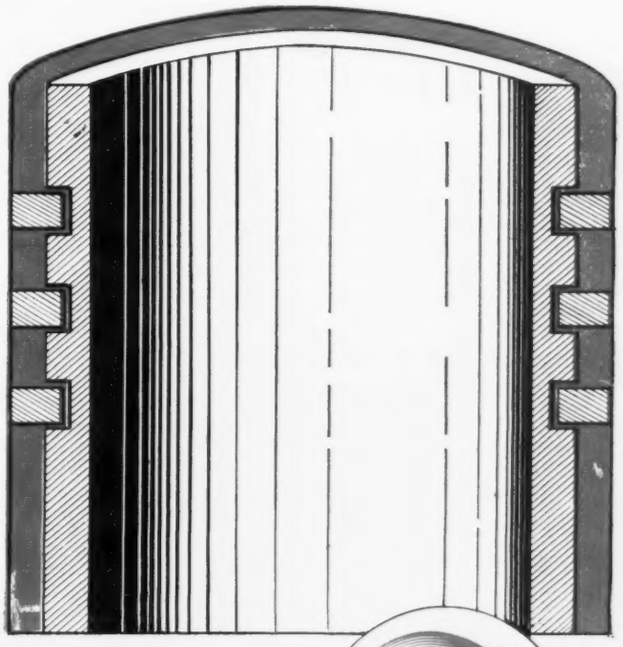
RPM DELO Oil clings to hot engine areas often left exposed to wear by ordinary uncompounded oils.

RING GROOVE WEAR REDUCED BY RPM DELO OIL

In a series of 1000-hour laboratory tests, Standard scientists proved that ring groove wear can be minimized with RPM DELO Diesel Engine Lubricating Oil.

Piston ring groove wear in an engine operated on a top quality straight mineral oil was thirty times that experienced with RPM DELO Oil in an identical test.

RPM DELO Oil reduces wear due to a metal-adhesion additive which makes it cling to and lubricate hot engine areas other oils often leave bare, and to other compounds which eliminate stuck rings and engine deposits, prevent bearing corrosion, stop oil foaming.



To match the fine performance of RPM DELO Oil use these equally efficient companion products from the same famous "RPM" line—

RPM HEAVY DUTY MOTOR OIL
RPM COMPOUNDED MOTOR OIL
RPM GEAR OILS & LUBRICANTS
RPM GREASES

For additional technical information write Dept. T-X, Standard of California, San Francisco 20, California, or California Commercial Company, 30 Rockefeller Plaza, New York 20, N. Y.

STANDARD OF CALIFORNIA

ACTION SHOTS ON ALL "FRONTS"!

Contractors, quick to see the bigger profit possibilities in the new postwar Lorain 41 series, are losing no time in taking every advantage of front-end interchangeability.

These on-the-job camera shots graphically show how the Lorain is truly a multi-purpose machine. Huskier, heavier, but more agile, and crammed with new features and structural improvements, a Lorain handles dragline, clam shell, hoe, shovel or crane work with equal facility.

Four-star performers in this brilliant Lorain 41 line:

Lorain 41 chain drive crawler—features the new 30" wide swamp type treads.

Lorain Moto-Crane 414—6 wheels, rubber tired, 4-wheel drive.

Lorain Moto-Crane 416—6 wheels, rubber tired, 6-wheel drive.

Lorain Self-Propelled 414—6 wheels, rubber tired.

All available with gas, diesel or electric power.

Get the *full* story of the new 41 Lorains from the nearest Lorain distributor to learn how a Lorain 41 can serve you on all the ranges of work that you will undertake in the busy years ahead.

Reg. Trade Mark

thew-Lorain

THE
THEW SHOVEL CO.
Lorain, Ohio

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

You've got to be GOOD to wear it!

● Like the Distinguished Service Cross, the AGC rating plate on a mixer or paver represents exceptionally meritorious service. For no mixer or paver can wear this symbol of quality unless it has earned the right. It is your assurance of guaranteed capacity and performance.

The AGC rating plate eliminates the guesswork about equipment. When you estimate a job, you know exactly what mixer and paver capacities are, right down to the last yard.

Why take a chance? Next time you buy, insist on equipment wearing the AGC rating plate. You'll find it pays!

MIXER MANUFACTURERS' BUREAU

Affiliated with the Associated General Contractors of America, Inc.

Member Names

Chain Belt Company
Milwaukee, Wis.

Construction Machinery Co.
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Ransome Machinery Co.
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Kwik-Mix Company
Port Washington, Wis.

The Foote Co., Inc.
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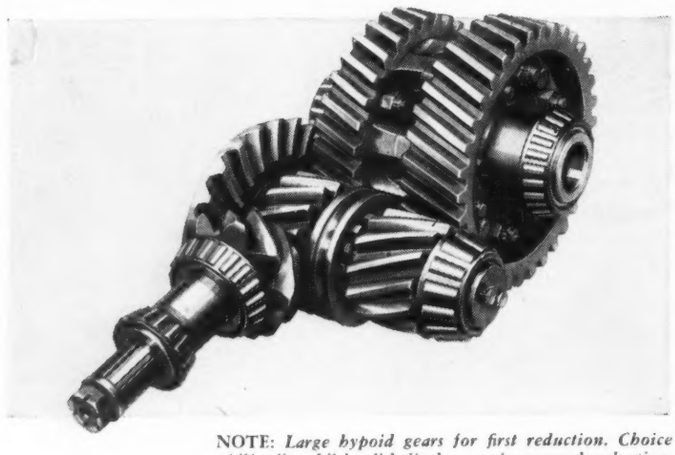
WANT TESTED TOUGHNESS?

Specify New TIMKEN S & U-300 2-Speed Double-Reduction Heavy-Duty Axles—Available NOW!

Postwar ADVANCED RELATED DESIGN



NOTE: *Large hypoid gears for first reduction. Choice of "fast" and "slow" helical gears for second reduction.*

- New 2-Speed hypoid-helical double-reduction drive.
- Famous Timken Easy-Power Shift for shifting to "fast" or "slow" axle speed in a split-second — without declutching. Vacuum or air actuated.
- New Torsion-Flow axle shafts forged of Timken "Axaloy" steel.
- New heavy-duty DP Dual-Primary hydraulic brakes, or famous P Series power brakes.
- New rigid mountings for gears.
- New, stronger differential with 9-16 tooth combination.
- New transfer bar hook-up for P Series power brake-equipped axles. New protected location for brake chambers.
- Double-reduction final drive units and 2-speed double-reduction final drive units are interchangeable in S and U Series axle housings without changing axle shafts.

"It's a helluva good axle," operators will tell you, "if it is anything like the famous S and U-200."

Fact is, the new S and U-300 axles are identical to S and U-200's, except that the 300's are 2-speed double-reduction instead of single-speed double-reduction.

But—most important to you—both S and U-200 and S and U-300 axles are in full production now! They are the only postwar single-speed double-reduction and 2-speed double-reduction heavy-duty axles immediately available!

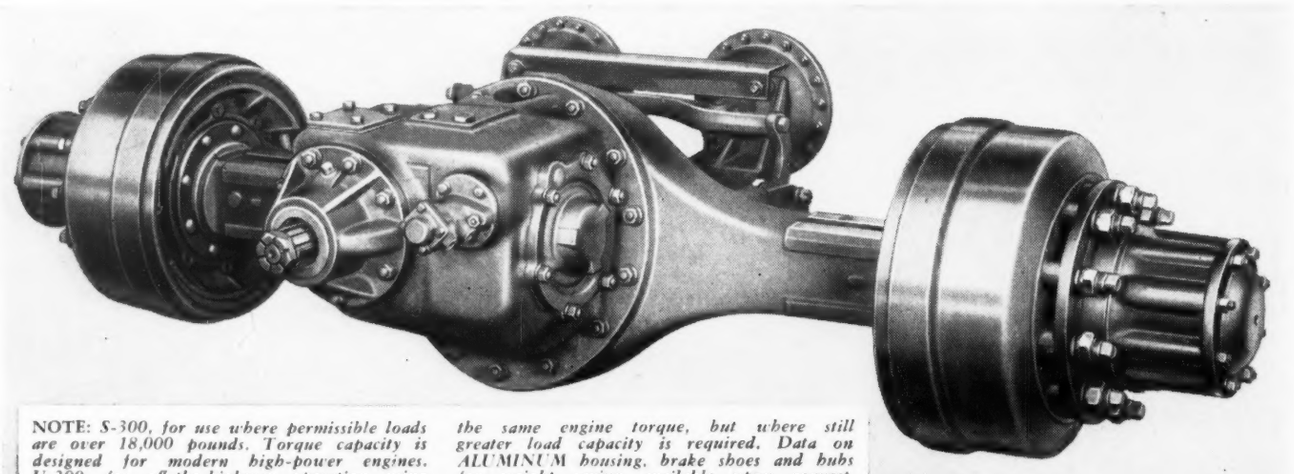
For tested toughness—for all that's latest and best in modern axle design—specify TIMKEN S or U axles under the next trucks you buy.

The Accepted DTA CO Standard

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICH.

WISCONSIN AXLE DIVISION • OSHKOSH, WISCONSIN



NOTE: *S-300, for use where permissible loads are over 18,000 pounds. Torque capacity is designed for modern high-power engines. U-300, for off-the-highway operation using the same engine torque, but where still greater load capacity is required. Data on ALUMINUM housing, brake shoes and hubs for weight saving available upon request.*

Making little ones out of *big* ones

PORTABLE PLANTS

Austin-Western Portable Crushing and Screening Plants are made in a wide variety of types and sizes; each complete with whatever is required in the way of conveyors, screens and bins.

• Key to the successful and profitable operation of any plant is the crusher itself . . . reason enough for the painstaking engineering behind every Austin-Western jaw and roll model.

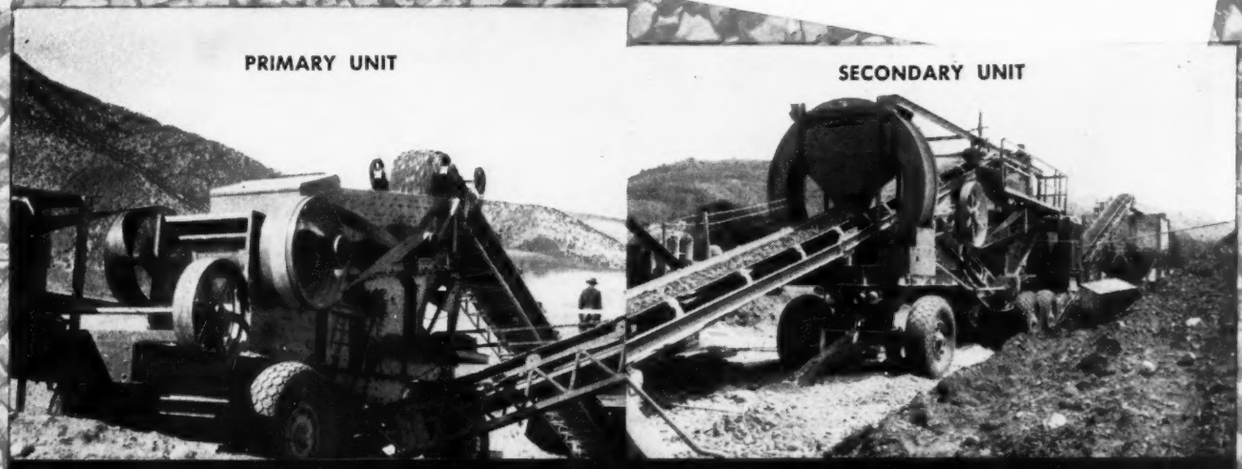
Exclusive features increase output, assure constant operation and reduce maintenance costs.

The same skilled engineering characterizes each and every Austin-Western crushing and screening plant, from the most simple to the most elaborate; each tailor-made to the requirements of a particular production problem.

AUSTIN-WESTERN COMPANY,
AURORA, ILLINOIS

PRIMARY UNIT

SECONDARY UNIT



TWO-UNIT AND THREE-UNIT PLANTS

Suitable for either pit or quarry use, these plants are capable of delivering highest tonnages of aggregate in accurately controlled sizes. Frequently, each unit is capable of producing material that meets job requirements, in which case the individual units can be used separately as shown in the photographs above. Such flexibility of operation spells maximum profits for the owner.

BUILDERS OF ROAD MACHINERY

Austin Western

SINCE 1859

BUY MORE WAR BONDS

You can START RIGHT HERE...

to count its money-saving advantages

BEGINNING at the moment its convenient 13-foot lengths are loaded onto the trucks . . . continuing during its rapid assembly in the trench . . . and lasting throughout its long years of service, Transite Sewer Pipe makes important contributions to more efficient, economical sewage disposal.

Consider this summary of money-saving advantages:

Fast installation. Transite's light weight means easier handling . . . more pipe per truckload. Its long 13-foot lengths reduce the number of joints in the line, speed up assembly.

Less infiltration. Its tight sleeve-type joint minimizes infiltration and cuts down on the sewage load at the disposal plant.

High flow coefficient. The smooth interior surface of this asbestos-cement pipe (n=.010) frequently permits the use of smaller pipe, or flatter grades with lower trenching costs.

Corrosion-resistant—outside, inside and all the way through! Transite's asbestos-cement composition, its homogeneous, dense structure and its low free-lime content result in a high degree of corrosion-resistance.

* * *

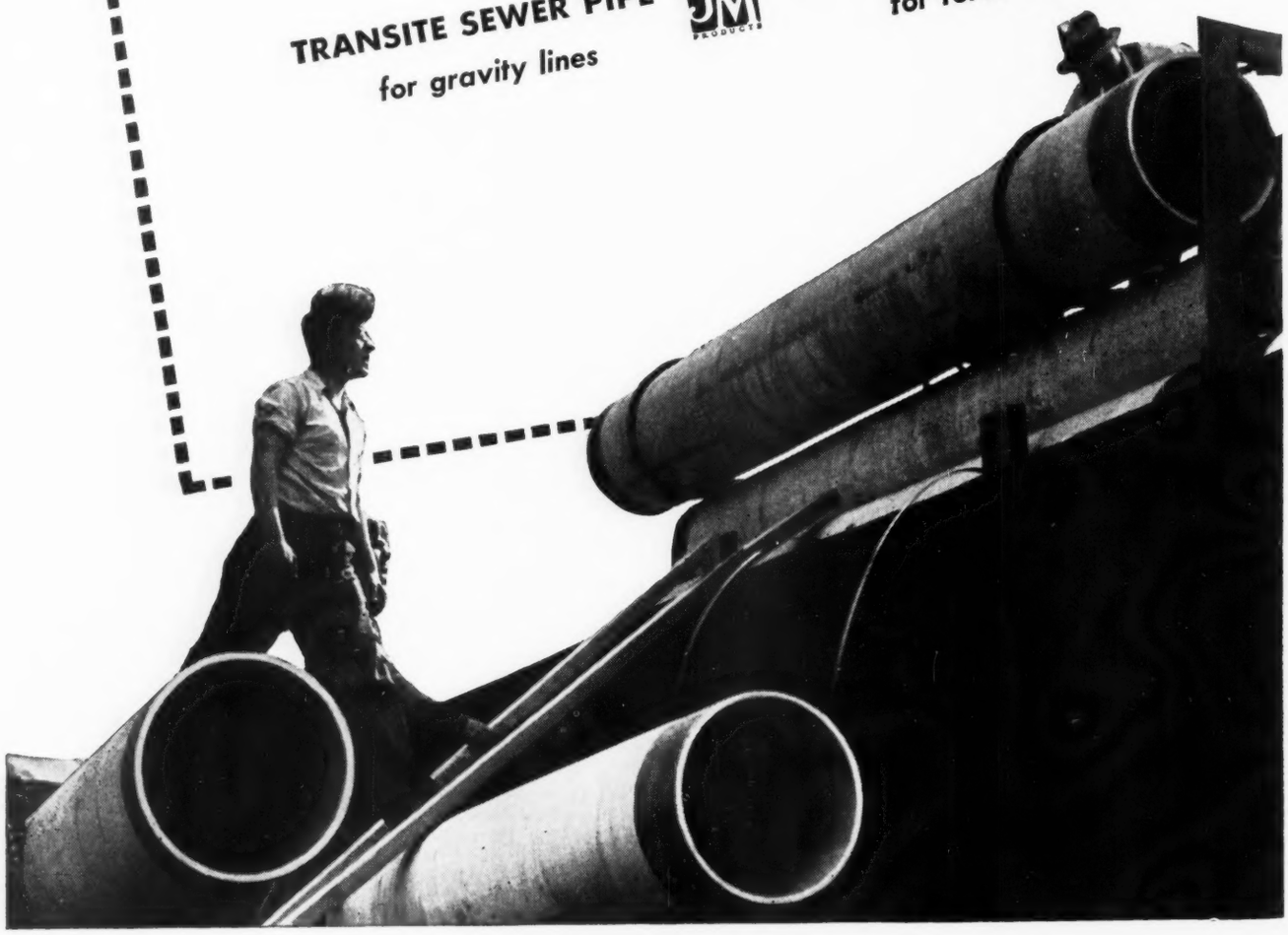
Further details on Transite Sewer Pipe for gravity lines are given in Brochure TR-21A; on Transite Pressure Pipe for force mains, in TR-13A. For copies, write Johns-Manville, 22 East 40th St., New York 16, N. Y.

Johns-Manville

TRANSITE SEWER PIPE for gravity lines

JM PRODUCTS

TRANSITE PRESSURE PIPE for force mains



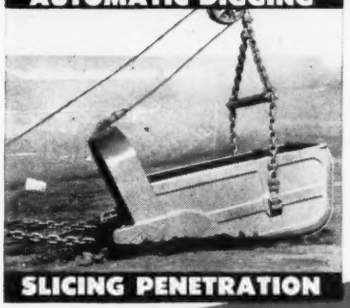
PMCO

America's Most Complete Line of Material Handling Buckets

Dragline Buckets

Sizes—⅜, ½, ¾, 1, 1½, 2, 2½ yds.

AUTOMATIC DIGGING



SLICING PENETRATION

Sharpest cutting edge of any dragline bucket

Bottom — One piece 14% manganese steel developing up to 120,000 p.s.i., making possible wide set corner teeth that break up material for easy, fast, penetration.

Body — Body sections tapered and rounded for easy dumping of wet sticky material.

Teeth — 14% manganese steel. Reversible socket type, easily removed for replacement. Kept tight in tapered socket by digging pressure.

See Your Equipment Dealer About PMCO Buckets

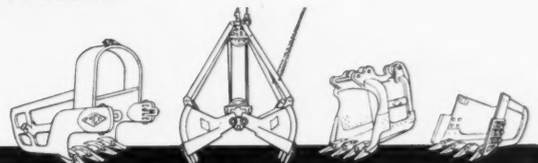
We operate the largest and most complete manganese steel foundry in the United States.

"Quality Since 1880"

PETTIBONE MULLIKEN CORP.

CHICAGO 51, U. S. A.

AED MEMBER ASSOCIATED EQUIPMENT DISTRIBUTORS



WE MAKE ALL FOUR BUCKETS

WHAT'S YOUR PROBLEM?

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: Magnolia Petroleum Company, General Petroleum Corporation of California

. . . really complete lubrication service can help you save time!

Are breakdowns of essential equipment causing costly delays? . . . Keeping other machines behind schedule?

Minimum "down-time" — more continuous plant operation . . . these are the advantages Socony-Vacuum's *complete* line of quality lubricants brings you! You're sure of exactly the right oil or grease for every part of every machine.

Wouldn't a carefully planned system of deliveries to machines in the field speed up your operations?

Wherever your contract takes you, we schedule regular deliveries right on the job. This service means both fewer and shorter field interruptions. Fewer inventory problems, too.

Have you found standard maintenance plans ill-fitted to your individual needs?

Because no two construction companies function exactly alike, we equip you with field-tested maintenance schedules, *carefully adapted to your specific needs!*

Do you have "problem" equipment—certain machines that constantly seem to cause trouble, disrupt schedules?

Sometimes the cause may be due to incorrect lubrication, in which case your Socony-Vacuum Representative is qualified to help you. He can also call in special lubrication engineers when necessary.

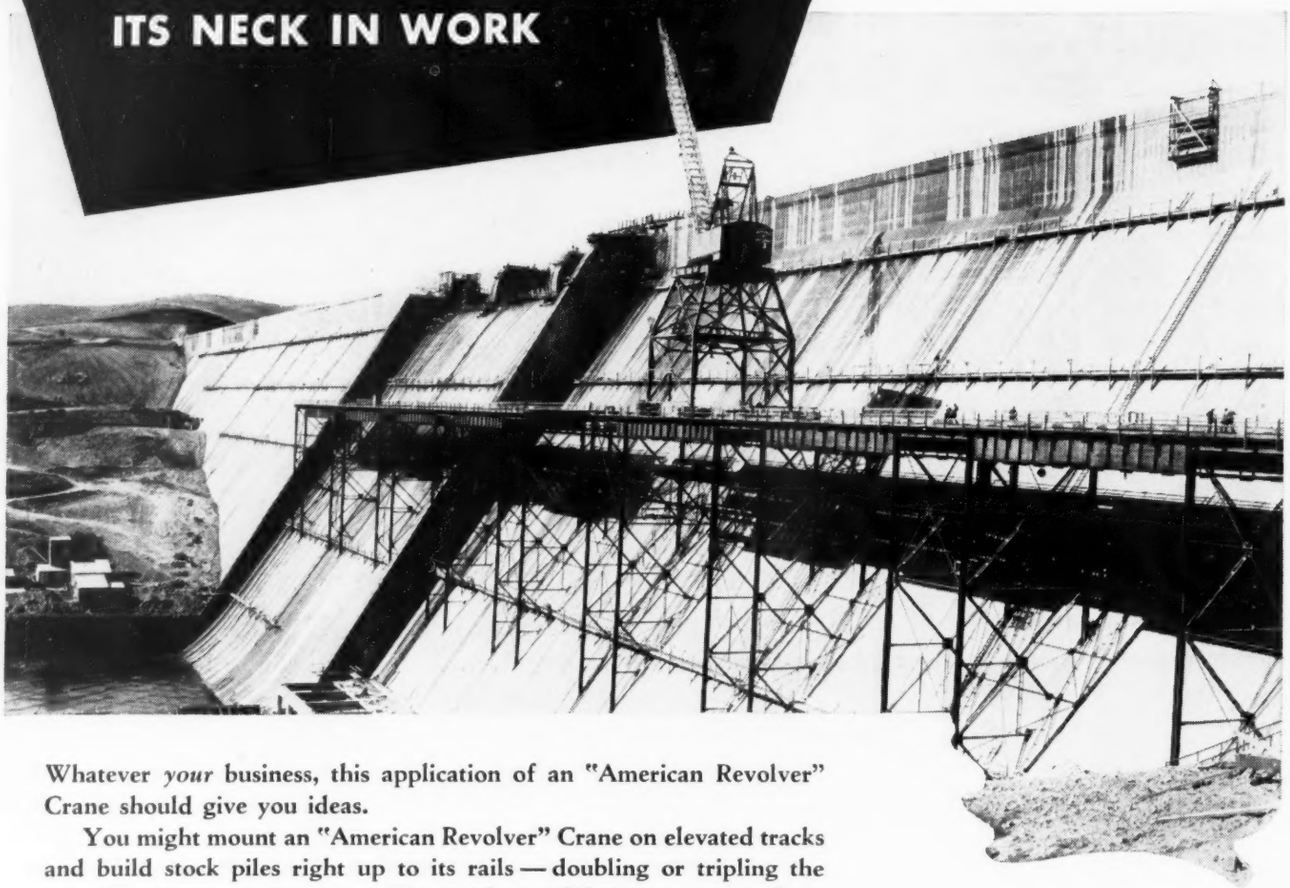
Are you looking for practical ways to train inexperienced men faster?

Your Socony-Vacuum Representative also teaches "green" help When, Where and How to lubricate every machine you operate.

Why Be Satisfied Merely With "Gas and Oil" When You Can Get Complete Service!

Tune in "Information Please"—Monday Evenings, 9:30 E.S.T.—NBC

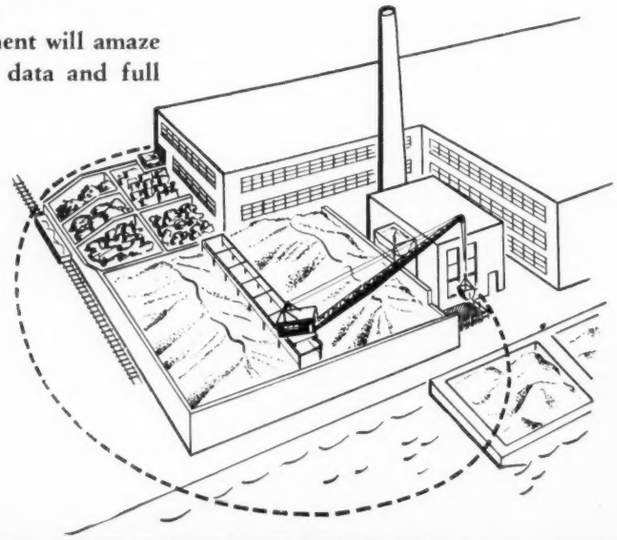
PAYING OFF: WHEN UP TO ITS NECK IN WORK



Whatever *your* business, this application of an "American Revolver" Crane should give you ideas.

You might mount an "American Revolver" Crane on elevated tracks and build stock piles right up to its rails — doubling or tripling the capacity of your storage areas. You might straddle one or two or three switch tracks with an "American Revolver" and have it serve storage areas and buildings a hundred feet each way. You might mount the machinery deck as a trolley to extend range, or bring raw materials to processing floors seventy-five feet above the ground. . . .

The flexibility, capacity and efficiency of this equipment will amaze you. Request the proof, we'll gladly supply pertinent data and full information.



RAILWAY - INDUSTRIAL CONSTRUCTION - MACHINES
AMERICAN HOIST & DERRICK CO.

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HOIST & DERRICK CO.
St. Paul 1, Minnesota
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REVOLVERS LOCOMOTIVE CRANES HOISTS DERRICKS BLOCKS AND SHEAVES CROSBY CLIPS

Speed Up Your Work Schedule with INTERNATIONALS

• That means you make more money, if you've figured right. And you figured right if you put International Tractors and International-powered equipment on the job. There's nothing that can beat them, size for size, in dirt moving, construction and maintenance work.

International Tractors keep moving—forever digging into the work laid out for them—at rock-bottom cost. They keep moving because they're rugged enough for the most punishing kind of work—because they're powered by International heavy-duty Diesel engines.

These great machines have the bulldog hang-on you want when cutting and filling with 'dozers, rippers or scrapers. They have the weight distribution and ratio of horsepower to weight that means sure-footed traction and mastery of any terrain.

Be sure to check with the International Industrial Power Distributor near you on the many advantages which International TracTracTors, Wheel Tractors and International-powered equipment have to offer.

The large number of manufacturers who build equipment expressly for International Tractors and Engines shows an acceptance where acceptance really counts!

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Industrial Power Division

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INTERNATIONAL Industrial Power

WE HONOR THE WEARERS OF THIS EMBLEM

Wearers of the service emblem, you have proved to the world that Americans with American-made machines could not be defeated. Many of you have used LIMA cranes, shovels and draglines to build air strips and bridges; to load and unload ships; to remove debris from bombed areas and countless other jobs important in winning the war. You have seen the efficiency of LIMA machines under trying conditions, how their smoothness of operation, ease of control and fast operating speeds step up the tempo of the job. To the veterans, who will continue to serve America in peacetime construction, LIMA offers the same high quality shovels, cranes and draglines which served so well in war. LIMA shovels are made in sizes ranging from 3/4 yard to 5 yards capacity, crane sizes range from 13 tons to 100 tons. Write for bulletins.

LIMA LOCOMOTIVE WORKS, INCORPORATED

SHOVEL AND CRANE DIVISION - - - - - - - - - LIMA, OHIO

NEWARK, N. J. DALLAS, TEXAS MEMPHIS, TENN. SEATTLE, WASH. PORTLAND, OREGON
SAN FRANCISCO, CALIF. SPOKANE, WASH. LOS ANGELES, CALIF. ST. LOUIS, MO.

LIMA

SHOVELS - CRANES - DRAGLINES

Capacities

SHOVELS
3/4 Yd. to 5 Yds.

CRANES
13 Tons to 100 Tons

DRAGLINES
Variable

WHEN YOU START THAT NEW BUILDING USE SCHRAMM AIR COMPRESSORS

Savings afforded you by Schramm Air Compressors will warrant your using them to get all the compressed air you need in your future construction work.

When you are able to get as much air as you need . . . wherever and whenever you need it . . . your job becomes so much easier! And the features of Schramm Air Compressors are designed for easy operation!

Features worth noting in Schramm: both engine and compressor 100% watercooled; (2) vertical cylinders, cast en bloc, afford the most compact design with no overhanging or projecting parts; (3) compact, lightweight and vibrationless; (4) mechanical intake and exhaust valves are the last word in design and efficient operation.

Write today for the new Schramm Catalog. Here you will find complete details for any type of air compressor you need, both stationary and portable.

SCHRAMM INC.

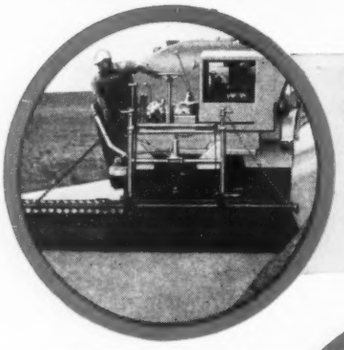
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Construction Completed

MAINTENANCE BEGINS

Proper and effective maintenance of pavements is fully as important as proper design and construction procedure. As is true with all other types of construction, maintenance must begin the day after construction is completed, and must be continuous throughout the year.

The primary objects of maintenance are: (1) keep a smooth surface, assuring quick and effective runoff; (2) keep the underlying base or subgrade dry; and (3) maintain contact between pavements and underlying courses. This requires effective slopes leading to drainage outlets, one hundred percent waterproof surface, and continual correction for consolidation or movement in supporting courses below. There is no substitute for preventive maintenance and constant patrolling is essential in order to detect and correct today those conditions which would progress into failures next year.



PRESSURE DISTRIBUTORS

Used in construction and maintenance of highways, streets and airports. Spraybars up to 24 feet in length.

MAINTENANCE DISTRIBUTOR

Drives material through Spray Bar or through Hand Spray. For maintenance and patch work or new construction.

TAR KETTLE

Can be equipped with either Hand Operated or Gas Engine powered Pump for use with Hand Spray.

OTHER PRODUCTS

Emulsion Spray Units • Kerosene and Distillate Burners • Supply Tanks • Tool Heaters Asphalt Tools • Street Flushers

SALES OFFICES IN PRINCIPAL CITIES

Standard Steel Works

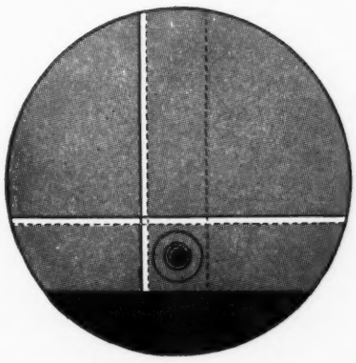
NORTH KANSAS CITY, MO., U.S.A.

Cut "*On the Job*" Material Losses

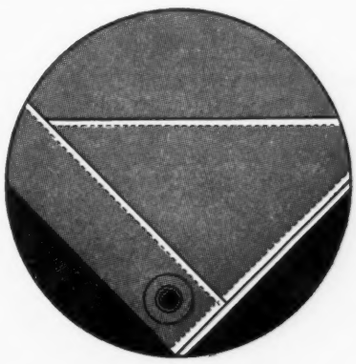
Protect with Bemis "Dri-Tite" Tarpaulins

Bemis "Dri-Tite" tarpaulins are now available in all standard sizes in varying weights. You'll find them real protection against moisture because the "Dri-Tite" waterproofing process renders paulins fully resistant to moisture. There's no "running" or softening in hot weather or stiffening and cracking in cold weather. Write to Bemis today for your 1946 price schedule on the complete "Dri-Tite" line of tarpaulins.

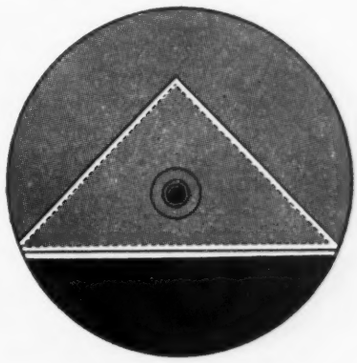
Look at These Construction Features of Bemis "Dri-Tite" Tarpaulins



1. Seams are double sewed with extra heavy rot-proof thread.



2. Corners are reinforced with an extra patch of canvas.



3. Rustproofed rolled rim spur grommets for extra strength.

BEMIS BRO. BAG CO.

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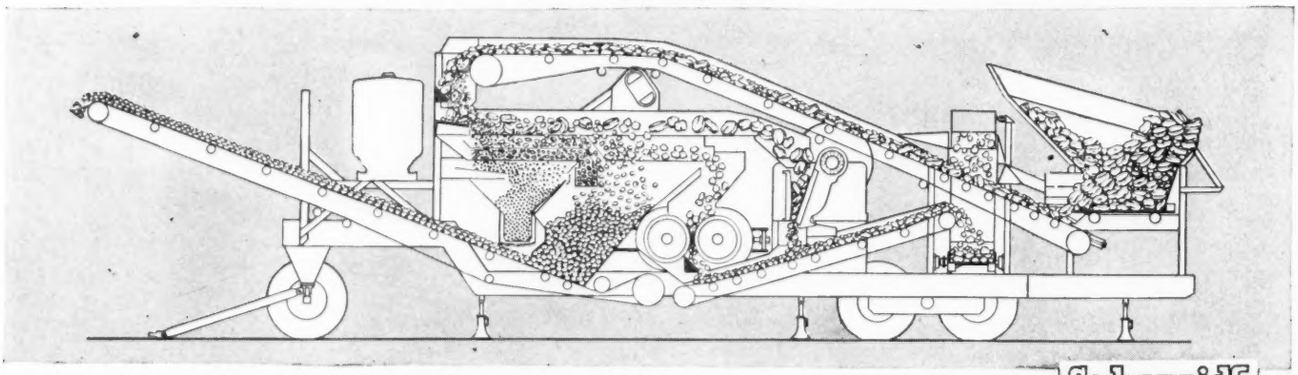
Get your copy today!

the new Cedarapids junior tandem

Get a copy of the brand new bulletin describing Iowa's newest portable straightline crushing plant, and you'll see why Junior Tandems are already setting records for high production at very low cost. Look how the material flows in a steady stream from the feeder through the plant taking full advantage of the high capacity of each unit with no waste motion. You never saw so much built-in flexibility arranged so effectively. Chip attachment and sand eliminator can be used as desired. Hopper and feeder are interchangeable with swivel feed conveyor to fit different loading conditions. Horizontal vibrating screen assures greater capacity, closer grading, higher efficiency and requires less head room. Choice of 10″ x 24″ or 10″ x 36″ roller bearing jaw crusher. V-belts and universal drives eliminate chains and sprockets. Fast, easy set-up and takedown minimize lost time between jobs. No belts to put on and take off. No drives to connect. Conveyors swing easily into position. These are only a few of the many advantages that give the Junior Tandem such high capacity and such low operating and maintenance costs.

See your nearest Cedarapids distributor right away for full details.

Iowa Manufacturing Company, Cedar Rapids, Iowa



Cedarapids

Built by IOWA

THE IOWA LINE *of Material Handling Equipment Includes*

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS

STRAIGHT LINE ROCK AND GRAVEL PLANTS
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PORTABLE STONE PLANTS
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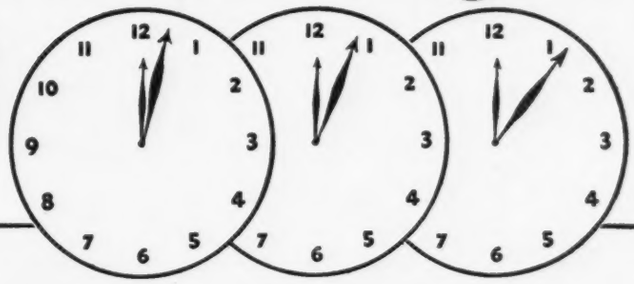
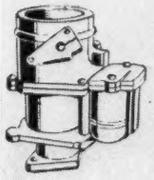
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS

How to Cut Metal Cleaning Time to MINUTES



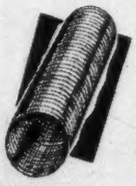
NEW, FAST-ACTION DETERGENT CLEANS FERROUS AND NON-FERROUS METALS...Easy to Handle

TYPICAL USES FOR Solvent "26"



CARBURETORS—Solvent "26" removes gum, gasolene sediment and other accumulations of dirt.

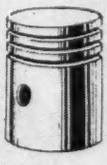
SPARK PLUGS—Solvent "26" safely cleans porcelain; helps loosen carbon deposits.



METAL PLATES AND SCREENS—Solvent "26" restores clear, clean finish to any metal surface.

DIES AND STAMPING—Solvent "26" removes drawing compounds from die-formed or stamped metal.

LABORATORY EQUIPMENT—Solvent "26" frees glass and metal tubing and their supports of gums, varnishes and other incrustations or deposits.



PISTONS—Removes lacquers, gums, resins, etc. from gas, gasolene and diesel engine pistons and rings. Also effective for cleaning all parts of dismantled motors, engines and machinery.

REMOVES:

Oil • Grease • Gums • Varnishes • Lacquers • Paints
Carbonaceous Deposits • Asphaltic Products

FROM:

Steel • Cast Iron • Aluminum • Porcelain • China
Chrome and Nickel Plate • Stone • Precious Metals
Brass • Washable Fabrics

Used throughout the war in critical industry as a superior cleaning agent, newly-developed SOLVENT "26" is now available for all industrial needs.

Offering many advantages in time, labor and cost over other present cleaning methods . . . Solvent "26" is so effective a detergent it can be used at *ordinary* room temperatures.

The fast action of Solvent "26" reduces cleaning time from hours to minutes on dismantled engine parts and all kinds of machinery. Simply dip, rub, brush or spray it on. Then flush clean with hot water.

Mail the coupon today for literature and information leading to a demonstration of this unique product in your own plant.

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Gentlemen: I am interested in a demonstration of Solvent "26"—at no cost or obligation.

Name.....

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Company.....

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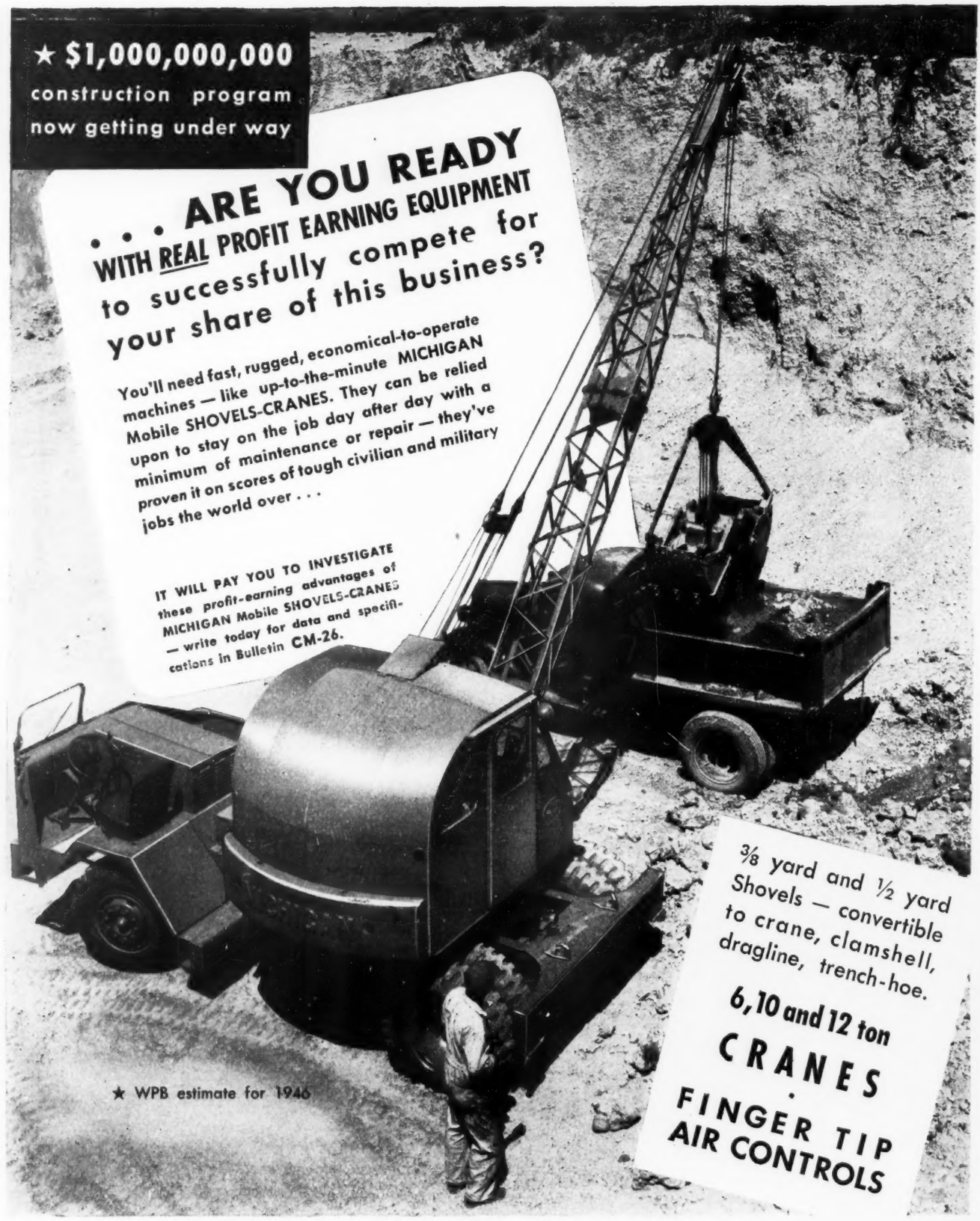
City.....State.....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construction program
now getting under way
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WITH REAL PROFIT EARNING EQUIPMENT
to successfully compete for
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You'll need fast, rugged, economical-to-operate machines — like up-to-the-minute MICHIGAN Mobile SHOVELS-CRANES. They can be relied upon to stay on the job day after day with a minimum of maintenance or repair — they've proven it on scores of tough civilian and military jobs the world over . . .
IT WILL PAY YOU TO INVESTIGATE these profit-earning advantages of MICHIGAN Mobile SHOVELS-CRANES — write today for data and specifications in Bulletin CM-26.
★ WPB estimate for 1946
⅜ yard and ½ yard Shovels — convertible to crane, clamshell, dragline, trench-hoe.
6, 10 and 12 ton
CRANES
FINGER TIP AIR CONTROLS

MICHIGAN
POWER SHOVEL COMPANY
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Canvas "Tent"

foils fire . . . defies weather

Let it rain . . . or snow—a canvas "tent" over this demolition and replacement job permits uninterrupted work despite the elements.

But *ordinary* canvas is a fire hazard. A hot rivet, a welder's torch or an overturned salamander might touch off a disastrous blaze.

That's why FIRE CHIEF Finished Hooperwood Canvas is first choice for construction work. Any fire is out before it starts because FIRE CHIEF will not support combustion.

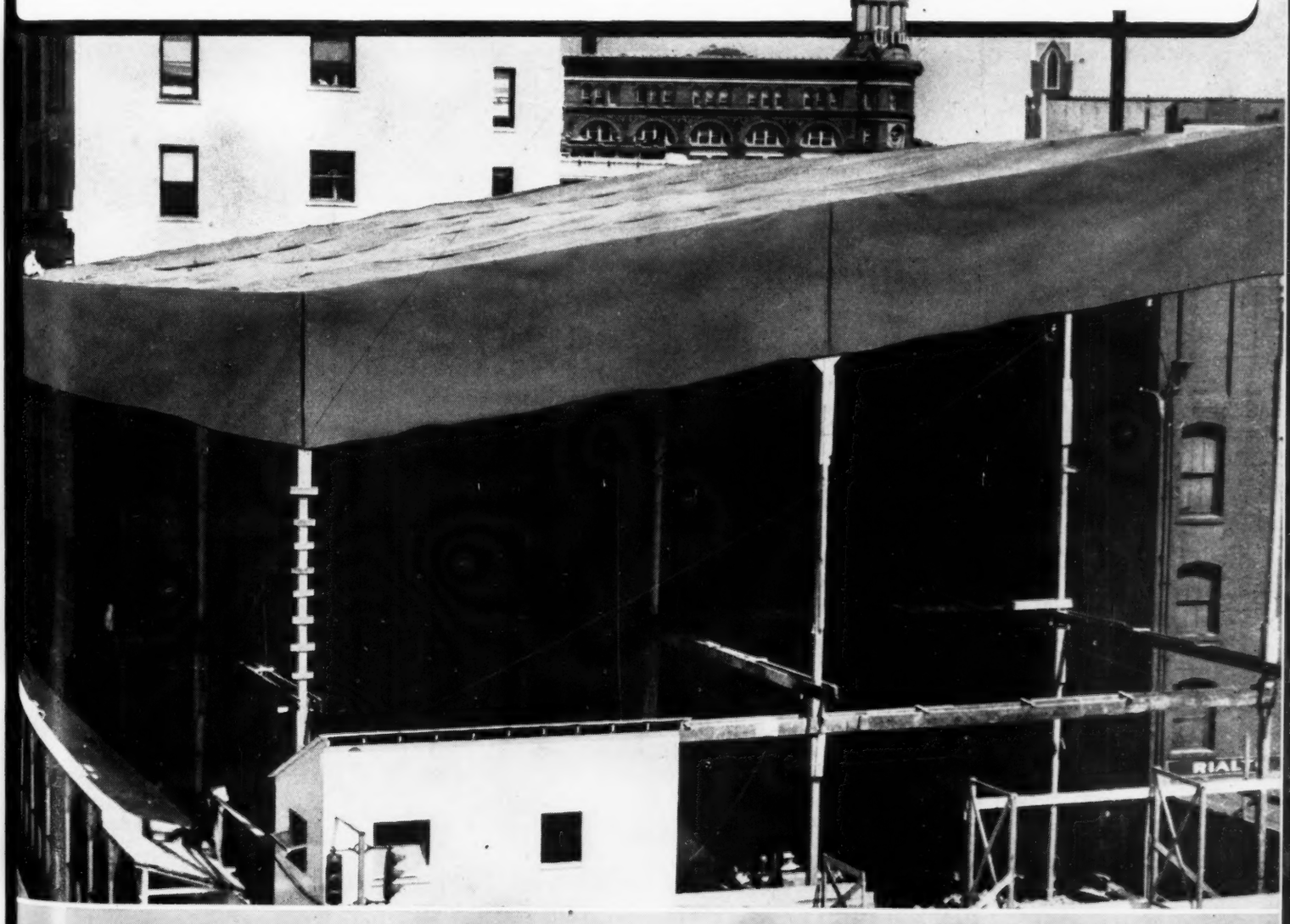
There are other advantages, too. FIRE CHIEF is also water, weather, wear and mildew resistant. It is flexible year round, and the FIRE CHIEF finish is permanent. Outlasts other canvas many times.

It's good business, and maximum protection, to insist on FIRE CHIEF for all tarpaulins and windbreaks.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBURY, BALTIMORE, MD.



Fire-Chief Finished (PATENTED)

HOOPERWOOD COTTON DUCK

Public Benefits will be Great in the NATION'S HIGHWAY PROGRAM

A large proportion of the nation's highways throughout the nation are scheduled for improvement in the next few years. This means an era of better, safer driving.

So tremendous a job is one for experts, capable of directing the work with the maximum economy, efficiency, speed and consideration for the needs and convenience of the public.

Highway officials, engineers and contractors have the experience, the technical knowledge and the determination to handle the work most effectively. Moreover, in carrying out this great modernization program, they know that it is essential to minimize delays and inconvenience to the public, which will be driving more than ever after so many restrictive years. A.G.C. contractors have an important place in this program. They can be depended upon to serve faithfully and well, because of the business principles for which the A.G.C. emblem stands.

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA · REG. U.S. PAT. OFF. · SKILL INTEGRITY RESPONSIBILITY

This advertisement is No. 4 of this series

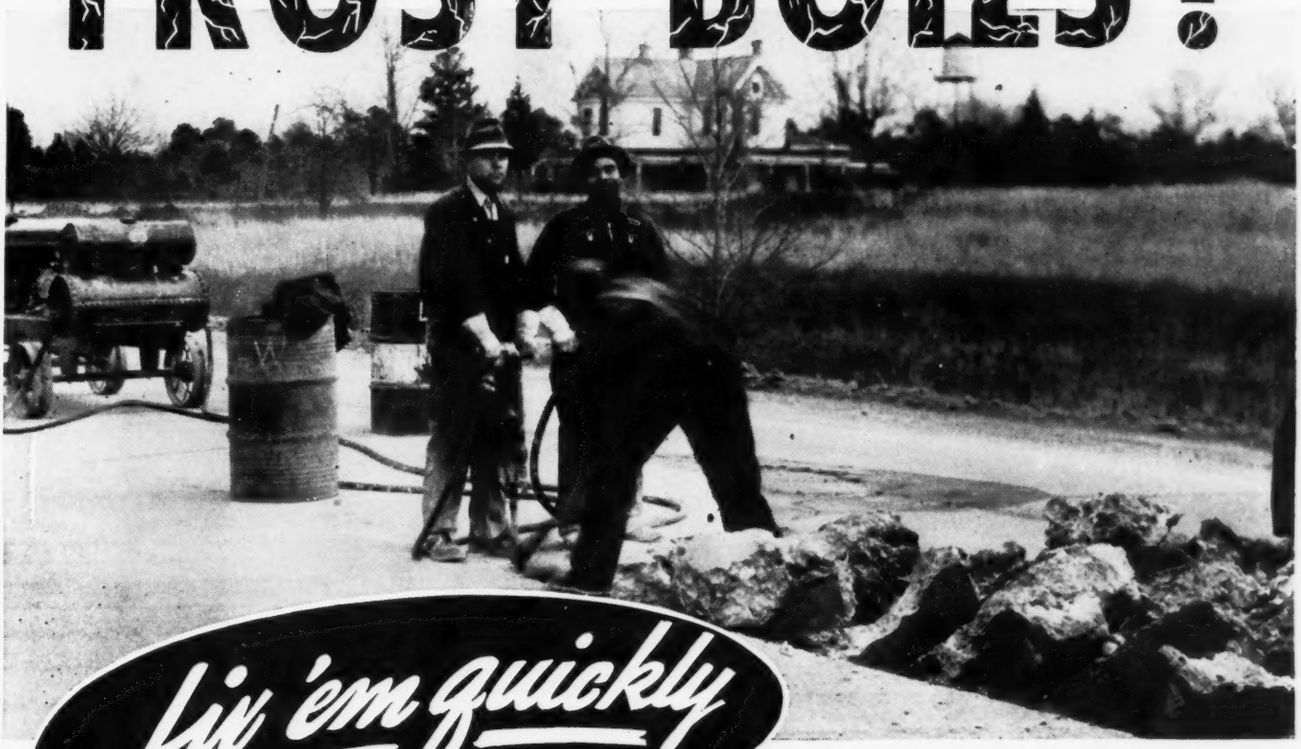
THE ASSOCIATED GENERAL CONTRACTORS of AMERICA, Inc.

Ninety Branches and Chapters Throughout America

National Headquarters — Munsey Building, Washington 4, D. C.

SKILL, INTEGRITY AND RESPONSIBILITY IN CONSTRUCTION OF BUILDINGS, HIGHWAYS, RAILROADS, AIRPORTS AND PUBLIC WORKS

FROST BOILS?



fix 'em quickly

WITH

CLEVELAND Paving Breakers

C7

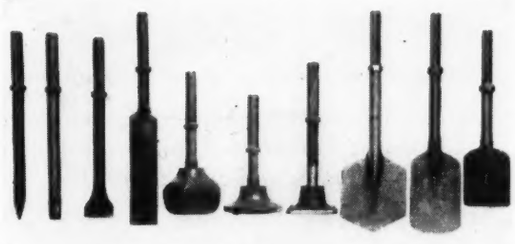
With the advent of spring thaws, you will need Cleveland Paving Breakers for emergency calls and hurry-up repair work.

Model C7 is best for the average job. It is an 80 lb. slugger, easy to hold. Two C7's can be run from a Number 85 compressor. For heavier work, try the C9, which is two pounds heavier but uses no more air. It is designed for breaking the hardest, reinforced concrete. For lighter work, trimming, etc., use the smaller C10, three of which operate from a Number 85 compressor.

Also be sure to select the proper chisels, moils, etc., from the "Clevaloy" line illustrated here. Bulletin 128 tells all about these Cleveland tools, and also contains many valuable hints on getting better service from your paving breakers . . . *Write for it!*

We also make sinker drills, wagon drills, clay diggers, tampers, accessories and a complete line of pneumatic tools for shop use.

CLEVALOY CHISELS, MOILS, TOOLS



Moil Chisel | Narrow Chisel | Wide Chisel | Digging Blade | Sheeting Driver | 7" Tamper Bar | 5" Tamper Bar | Clay Blade | Clay Spade | Asphalt Cutter

CLEVELAND ROCK DRILL DIVISION

THE CLEVELAND PNEUMATIC TOOL COMPANY

CABLE ADDRESS: "ROCKDRILL" • CLEVELAND 5, OHIO

Leaders in DRILLING EQUIPMENT

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Lexington 19, Ky.
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Newton Highlands 61, Mass.
New York 6, N. Y.
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San Francisco 3, Calif.
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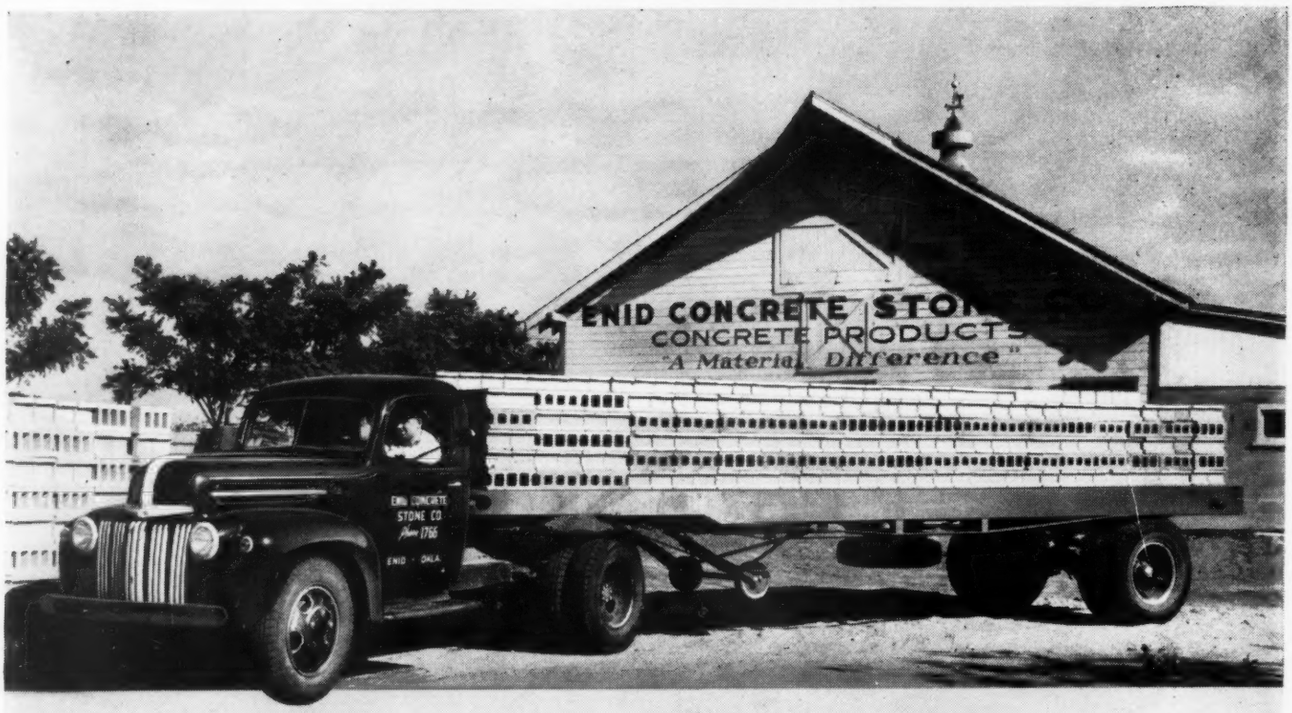
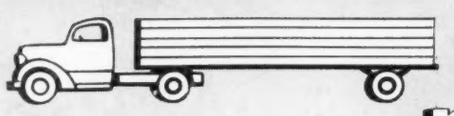
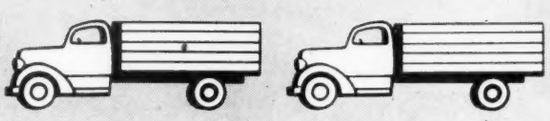
Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.
Industrial Machinery Co., Ltd., 163 N. Water St., Halifax, Nova Scotia



1  THAT DOES THE WORK OF 2 

How ENID CONCRETE STONE CO. SERVES CUSTOMERS BETTER WITH FRUEHAUFS!

If your construction job calls for concrete blocks, Haydite masonry, pre-cast lintels, floor joists, manhole covers, silo staves, etc., and your purchase comes from Enid, you can be sure the loads will roll to you in a Fruehauf Trailer.

On the Fruehauf pictured above are 1120—6″ x 8″ x 16″ Haydite blocks—a 20,000-lb. load pulled by a new Ford 1½-ton Truck. Loads like this are hauled within a radius of 150 miles of the Enid plant.

The Enid Company officials will tell you from their experience they have found their Fruehauf equipment permits them to serve their customers better and promotes finer customer relationship. They cite these advantages:

1. One Truck and Trailer delivers as much as twice the load which could be carried safely on 2 trucks of the same horsepower rating as the one which pulls the Trailer.
2. Bigger loads mean less trips to do the same job.
3. Since one Truck and Trailer does the work of the 2 Trucks—this makes possible added savings in gasoline, oil and upkeep.
4. The Trailer—the detachable body—always outlives the power unit, thus replacement cost of the truck alone is much less.

Your particular construction work may call for this type of Flat-bed Trailer—or perhaps a different design to move big bulky equipment.

Why not call in the Fruehauf man in your locality? His experience and knowledge will be invaluable in the proper selection of new equipment.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER CO., DETROIT 32

8 Factories—60 Factory Service Branches

FRUEHAUF TRAILERS

A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

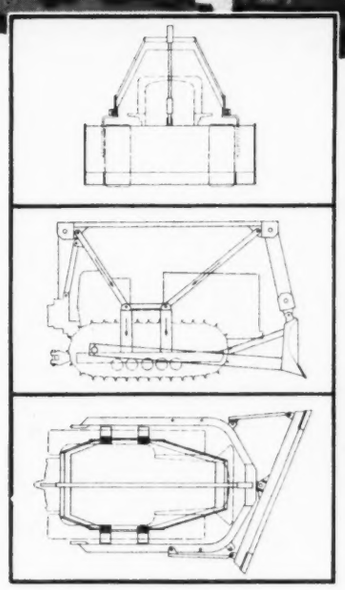
"ENGINEERED TRANSPORTATION" Reg. U.S. Pat. Off.

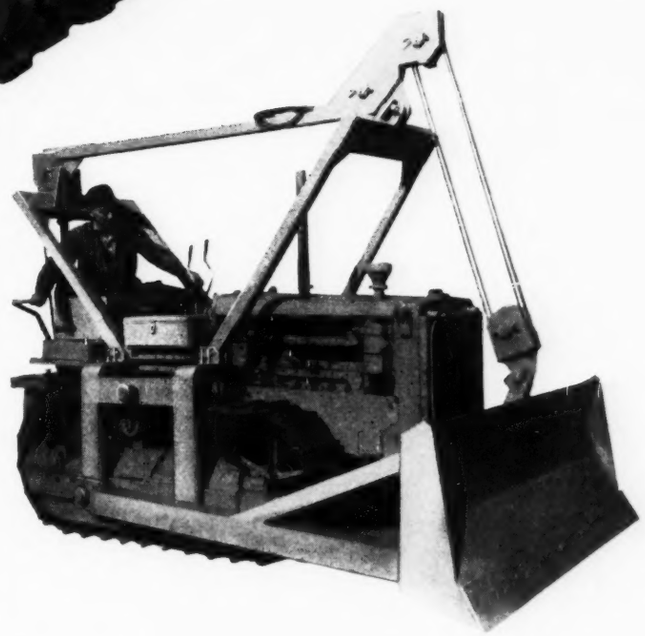
Southwest
Cable loaders

Southwest Cable Loader Attachments for over center track mounted Bulldozers and Trailbuilders will speed up your loading operations. The versatile design of Southwest units permits low-cost conversions from one to the other in less than 30 minutes.

Cleaning up next to buildings and curbs is an easy job with Southwest Loaders because the bowl is wider than the tracks and side arms.

Remember — Southwest builds for all four makes of track type tractors. (Bulletins will be sent on request.)





"Over Center Track Mounted" design gives perfect balance

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

SCOOPS BULLDOZERS CRANES WINCHES DUMP WAGONS RIPPERS TAMPERS SCRAPERS

NAME YOUR JOB

— here's your tire!

It's a point-blank fact—proved by on-the-job experience—that work moves faster and costs drop lower when scrapers, wagons and power units are *each* equipped with the *right* tire for the job at hand.

That's the logic back of Goodyear's 3 types of big work tires—the job-proved huskies that pay off in faster, lower-cost operations. *Buy* and *specify* Goodyears and you'll soon know why "MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND."

Sure-Grip, All-Weather—T.M.'s
The Goodyear Tire & Rubber Company

SURE-GRIP EARTH MOVER
— *Super traction* — for drive wheels where traction counts most

HARD ROCK LUG
— *Super armored* — for all rough and rugged rock work

ALL-WEATHER EARTH MOVER
— *Sure roll* — for drawn vehicles and general purpose traction

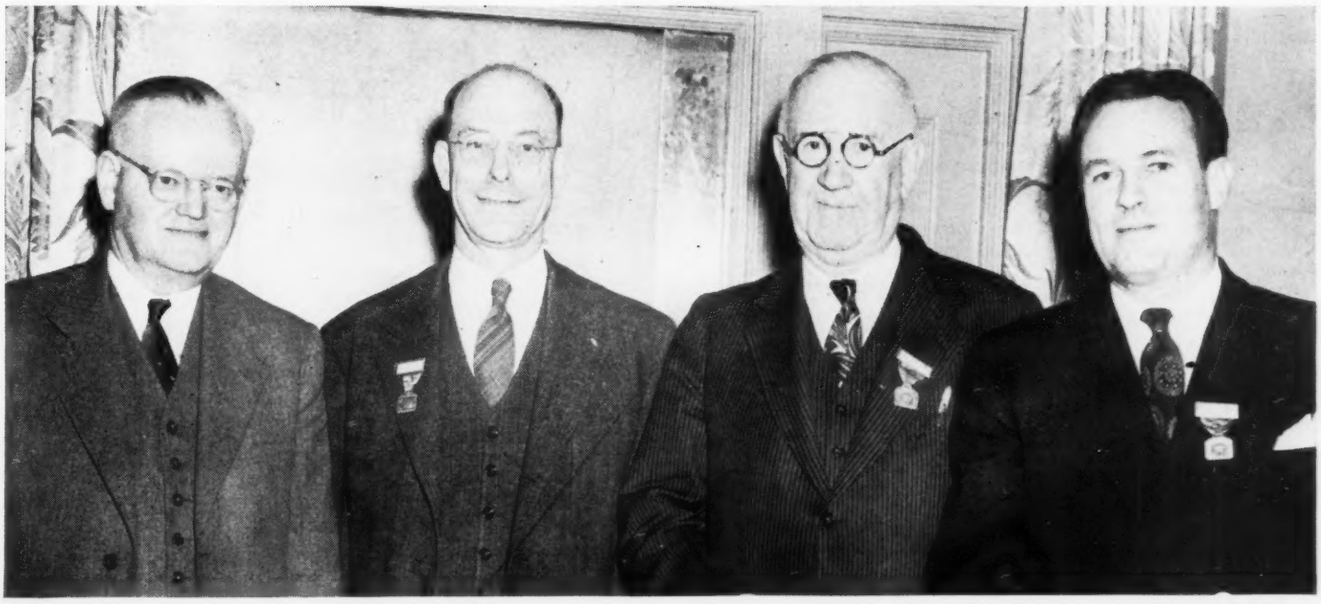
GOODYEAR

THE GREATEST NAME IN RUBBER

Construction Methods

WALDO G. BOWMAN, Editor

Volume 28 — FEBRUARY, 1946 — Number 2



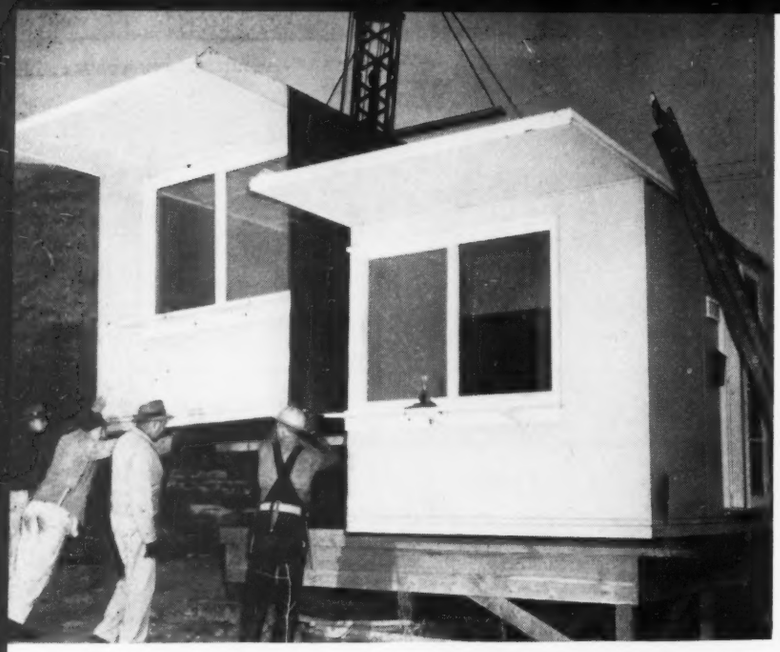
AMERICAN ROAD BUILDERS ASSOCIATION begins 1946 under leadership of President JAMES J. SKELLY, standing here with three division presidents at 43rd annual meeting Jan. 14-17 in Chicago, where all four men took office for this year: (Left to right) NATHAN L. SMITH, Baltimore, president, Municipal Division; PAUL B. RYNNING, Medford, Ore., president, County Division; JAMES J. SKELLY, Media, Pa., A.R.B.A. president; CHARLES W. SMITH, Pensacola, Fla., president, Contractors' Division.

Road Builders Convene in Chicago

Forty-third Annual Meeting of A.R.B.A. Elects Skelly President—Upham Directs 4-Day Program

IN CHARGE OF CONVENTION PROGRAM was CHARLES M. UPHAM, engineer-director of A.R.B.A. (center) here shown with CAPT. PAUL ANDREWS, U. S. Navy, (left) who told of war work of Seabees, and HON. JAMES W. ROBINSON, chairman, Committee on Roads, U. S. House of Representatives who delivered address on "Federal Responsibility in Highway Transportation."

THIS MONTH'S NEWS REEL



PREFABRICATED HOMES and one-room trailers are moved by U. S. Bureau of Reclamation from atomic bomb plant area near Hanford, Wash., to Grand Coulee to relieve acute housing shortage at Coulee Dam. Crew is shown lowering section of house into position alongside companion section on timber foundations.

LATIN AMERICAN ENGINEERS visit United States to study railroad and highway procedures. Conferring in Washington are (left to right): EDUARDO A. SALGRADO, assistant director, Highway Department of Peru; THOMAS H. MACDONALD, U. S. Commissioner of Public Roads; COL. MAURICE E. GILMORE, acting director, Department of Transportation and Economic Development, Office of Inter-American Affairs; GUILLERMO COMACHO, general traffic manager, Colombian National Railway, Colombia; CHARLES M. UPHAM, engineer-director, American Road Builders' Association; and JUAN QUIRAGO, chief designing engineer, Peru.

GOVERNMENT HOUSING PROGRAM is announced at press conference by JOHN D. SMALL, chief of Civilian Production Administration. Planned to spur home construction, program went into effect Jan. 15. Press Association, Inc.

HIGHWAY RELOCATION (below) of Washington State Route 99, north of Woodland, is 2.4-mi. project requiring sidehill cuts up to 220 ft. in depth. Here Leonard & Slate Oregon, Ltd., contractors, of Portland, Ore., are using Caterpillar D8 tractor with ripper to loosen hard material for scraper loading.

NISSEN HUTS (below) are erected by Grenadier Guardsmen in Windsor, England. Program has dual purpose of providing temporary housing for bombed-out families and vocational training for Guardsmen due for early demobilization. British Combine Photo

NEW YORK STATE'S $5,000,000 PROGRAM for converting military installations into emergency housing quarters for war veterans and their families gets under way at Fox Hills Army Terminal Barracks in Stapleton, S. I. Here GOVERNOR THOMAS DEWEY (center), who drove first nail, examines blueprints with PETER W. ELLER (left), president, Thompson Starrett Co., contractors, New York, and ALFRED RHEINSTEIN, contractor and state director of emergency construction. Fox Hills, which will be converted at cost of about $800,000, is expected to house 700 families.

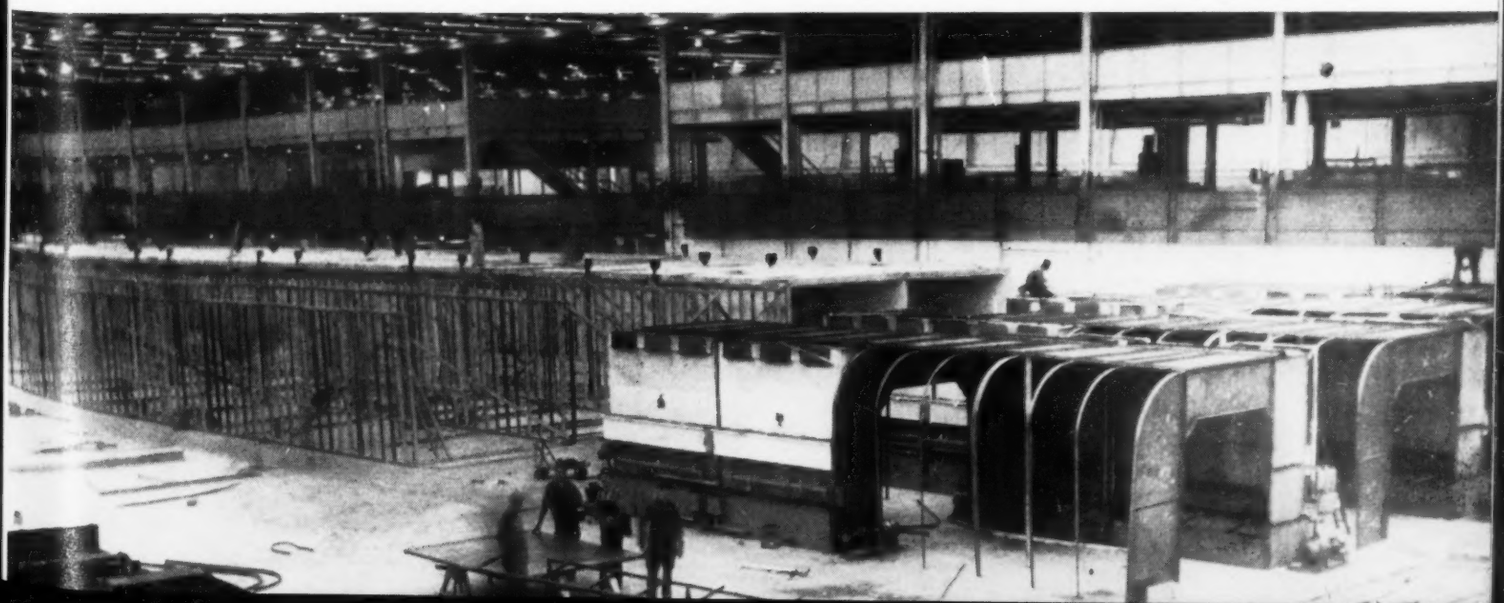
N. Y. Sun Photo

→ PROSPECTING FOR GOLD on site of reservoir which will be formed by completion of Anderson Ranch Dam in Idaho is undertaken by U. S. Bureau of Reclamation to balk possible legal action by holders of placer claims which will be submerged by rising waters of south fork of Boise River. Here workmen are operating churn drill to obtain samples for mineral deposit investigation. The 8,650,000-cu. yd. earthfill dam is being built under direction of R. J. Newell, regional director of Reclamation Bureau, by Morrison-Shea-Twaits - Winston Co.

← ACCESS ROAD TO ATOMIC BOMB PROJECT in New Mexico (described elsewhere in this issue) is 6.3-mi. route built under exceptionally difficult topographic conditions, involving cuts in almost vertical face of canyon.

WILLOW RUN IS CONVERTED to auto production. Kaiser-Frazer Corp. expects to turn out 300,000 passenger cars a year in this former bomber plant (below) at Detroit. Drying ovens will be located in left background and newly painted cars will pass through them after spray painting job in booths at right.

Press Association Photo



Caisson Underpinning Checks Settlement of Te Ta

COMPLETED CAISSON, one of five, is ready for concrete. Upper part is steel shells jacked down in section; after excavation reached heavy blue clay, caissons were carried to rock by Chicago Well method.

A DIFFICULT JOB of underpinning with caissons, incorporating a clever design of rocker support, has successfully checked settlement of a group of ten concrete grain elevators built in 1926 for the Chicago & North Western Ry., along the waterfront at Green Bay, Wis. The elevators consist of 25½-ft. circular monolithic concrete cells from 108 to 170 ft. high, arranged in two rows of five each, set parallel with the riverfront. All cells are carried on a single 30-in. concrete slab which, in turn, is founded on wood piles. The slab, 59x144 ft. in area, lies only 9 ft. from the bulkhead that defines the river bank. It extends only 3 ft. 8 in. beyond the outside circumference of the cells, so the first row of cells is only 12 ft. 8 in. from the bulkhead. Borings show the underlying soil to consist of 37 ft. of sand underlaid by 50 ft. of blue clay to rock.

In 1916 the original timber elevators on the site burned down. Investigation at the time the concrete elevators were designed revealed 1,320 original wood piles about 20 ft. long, in good shape and available in place for supporting the new structure. Tests of these piles under 20-ton loads for eight days showed no settlement so they were considered safe for a design load of 10 tons each. In addition, 560 new 50-ft. wood piles were driven in the area, making a total of 1,880 piles to carry 19,000 tons of live and dead load.

LIMITED WORKING SPACE (below) hampered sinking of caissons under 10-cell grain elevator to check prolonged settlement. Preliminary work included drainage of sand fill under foundation slab, handled by three 8-in. pumps as shown here. Pump in foreground is set in separate sump outside of cofferdam area; other two are working from individual cofferdams driven for each caisson.

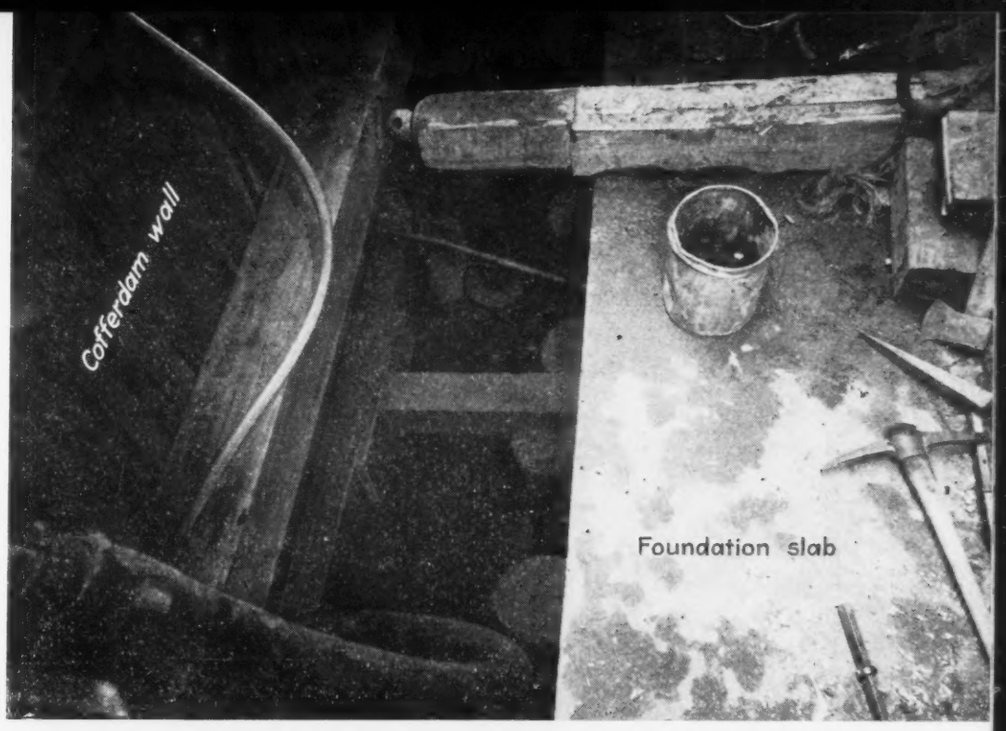
Despite the safe loading indicated by the tests, the structure started settling immediately upon completion, and in recent years the sinking has been faster on the river side of the foundation slab, throwing the cells out of plumb. By last summer the combination of sinking and tipping reached the stage where remedial measures were necessary to preserve the structure. At that time the slab showed a total settlement of 2½ ft. on the back side and 4 ft. 2 in. on the front or river side.

Several Methods Considered

B. R. Kulp, chief engineer of the North Western, retained the John S. Metcalf Co., Chicago, as engineers and general contractors. They called upon Seth M. Gooder, presi-

dent of Gooder-Hendrichsen Co., Inc., Chicago, shoring and underpinning specialists, to help work out a feasible method of checking the settlement. F. W. Creedle represented the railroad company on the job. A. W. Kirkpatrick was named superintendent for Metcalf, and John Edwin Olson and Walter Hansen were in charge of field work for Gooder-Hendrichsen.

Several plans were considered, but whatever method was adopted had to take the following difficult conditions into consideration: First, the elevators were in constant use and could not be shut down or unloaded. Next, the top of slab, originally above water level, was now 5 ft. below water due to the settlement and a 2-ft. rise in river level. As the top of slab serves as the basement floor carrying the conveyor and elevating machinery, the cell walls could not be cut into without flooding the basement.



COFFERDAMS, one for each of five caissons, were driven outside of foundation slab, with short sheeting tying in cofferdam walls with elevator cell walls on right. Piles shown are those remaining from previous foundation.

# of Te Tall, 20-Year-Old Concrete Grain Elevators on Waterfront

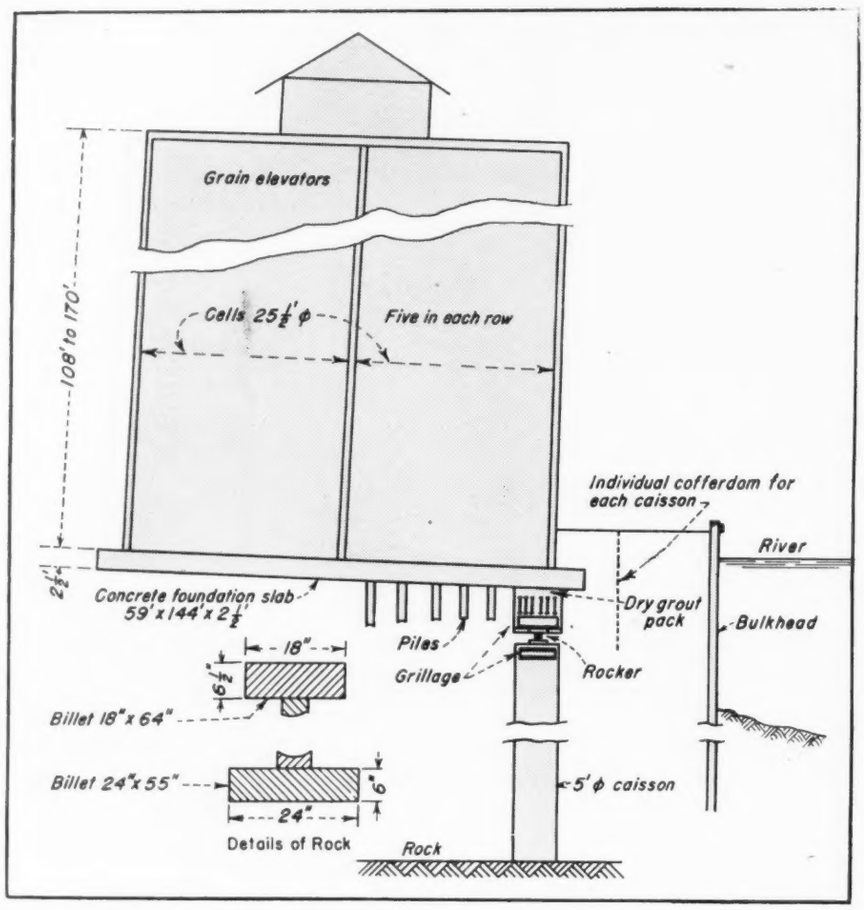
First consideration was to jack the cells back to plumb position above the slab. This, however, would not be a permanent solution unless the foundation trouble was also corrected. To hold the cells plumb, the entire foundation would have to be underpinned to rock, a procedure considered far too costly.

The next plan was to underpin the low edge of the slab with a row of caissons, then jack the whole foundation back to level position. Though costly, this plan was feasible, but it had the disadvantage of throwing the cells out of plumb the other way in case of further settlement of the back side of the slab.

This plan was abandoned in favor of a third scheme to underpin the low or front edge of the slab

STEEL SHELLS (below) to form upper part of caisson were jacked down in 6-ft. lengths to effect water seal in underlying blue clay. Inside bands at top of each shell section formed sleeve joint, which was welded watertight.

PILES WITHIN EACH CAISSON AREA (below) were pulled through hole cut in foundation slab. Pulling was done with jack and sling arrangement, and as piles were pulled they were cut off in 8-ft. lengths because of limited headroom.



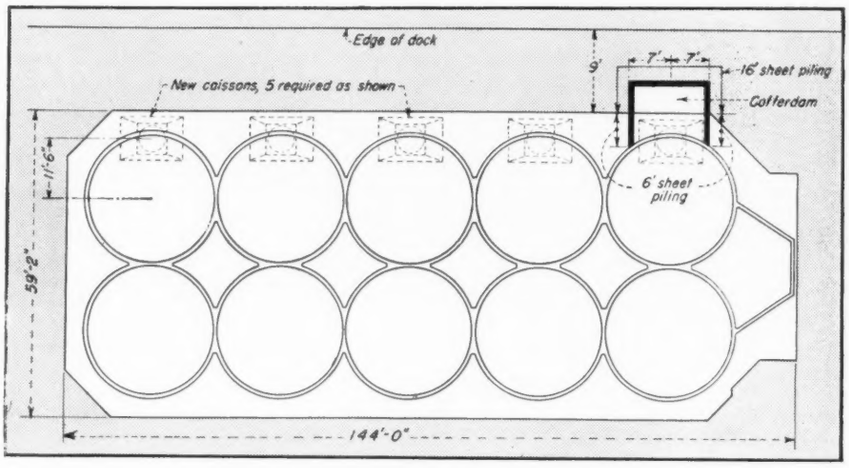
CROSS-SECTION of elevators shows position of underpinning caissons. Ingenious rocker support will permit back side of foundation slab to settle without disturbing the front side, thus tending to throw the structure back into plumb position.

with five caissons carried to rock and topped with steel rockers to provide bearing between top of each caisson and underside of slab. This method would pin the low side of the foundation in place, yet would permit a further settlement of the high side without introducing bending stresses in the new supports. For several years at least, additional settlement of the remainder of the slab will tend to right the structure. This scheme was found to be reasonable in cost considering the value of the property, though changes in vertical position of the cells will necessitate readjustment of scales and other equipment.

Caissons Sunk One at a Time

The contractors decided to proceed with one caisson at a time, carrying each one to completion before starting the next one in order to minimize disturbance of the piles. This procedure involved the risk of possible settlement during the construction operations, especially serious after one or more caissons were in place, for then the structure would warp under uneven settlement. However, no such settlement occurred during the five-month life of the job, attributed largely to the seal. From then on the caissons were continued throughout with the Chicago Well method. The clay was stiff enough to permit excavation without bracing until 4-ft. lengths of timber lagging could be set against the wall. These were braced with two steel split rings. No pump-

(*Continued on page* 148)



CONCRETE GRAIN ELEVATOR along waterfront consists of ten cylindrical cells ranging in height from 108 to 170 ft.

Cited for Service

WARREN S. BELLOWS

LONG INTERESTED in contractor association affairs, in the welfare of his industry, and in labor activities, Warren S. Bellows of Houston, Tex., becomes president of the Associated General Contractors of America this month at the annual convention in Chicago. Since 1938 he has been an A.G.C. director, and served as vice-president during the last year. His labor activities include membership on the A.G.C. Labor Committee since 1939 and service as the Industry Member of the Regional War Labor Board at Dallas.

Big in stature and a big operator, Bellows has been one of the outstanding building contractors of the Southwest ever since he founded his own company, W. S. Bellows Construction Co. in 1915 in Houston, four years after graduating in civil engineering from the University of Kansas. Notable war construction projects with which he was associated include the huge Naval Air Training Station at Corpus Christi, Texas; four Army Air Corps training stations in Texas, and the big Naval Ammunition Depot at McAlester, Okla.

Most impressive of his pre-war jobs was the San Jacinto Monument at San Antonio, Texas, rising 570 ft. as the highest masonry shaft in the world. Buildings have been his chief business, however. Scores of churches, college buildings, hospitals, public buildings, industries and office buildings in Texas, Oklahoma and surrounding states have been erected by his firm.

In spite of all his business and association activities, Bellows has found time to take part in American Society of Civil Engineers and Houston civic affairs.

His interest in the war went far beyond his war construction jobs, for two of his four children were officers in the armed services. Warren S. Jr. served as a Lieutenant in the Seabees with the 10th Naval Construction Brigade, which ended up at Okinawa, and young Frank was also in the Pacific as a Lieutenant in the 2nd Sep. Engr. Bn. of the Marines. Bellows' genial personality, his selfless devotion to contracting and outside activities and his fair and sound attitude toward labor and the small contractor have won him a multitude of friends throughout the Southwest. Warren Bellows is a man's man and a contractor's contractor.

STEEP CANYONSIDE CUT, with inner face almost vertical, is required for road location. Material is handled by fleet of tractor-hauled scrapers, bulldozers and power shovels.

Atomic Bomb Highway

Carved Out of Canyon's Side to Provide Access to New Mexico War Research Project

BY LINDSAY F. ROOT

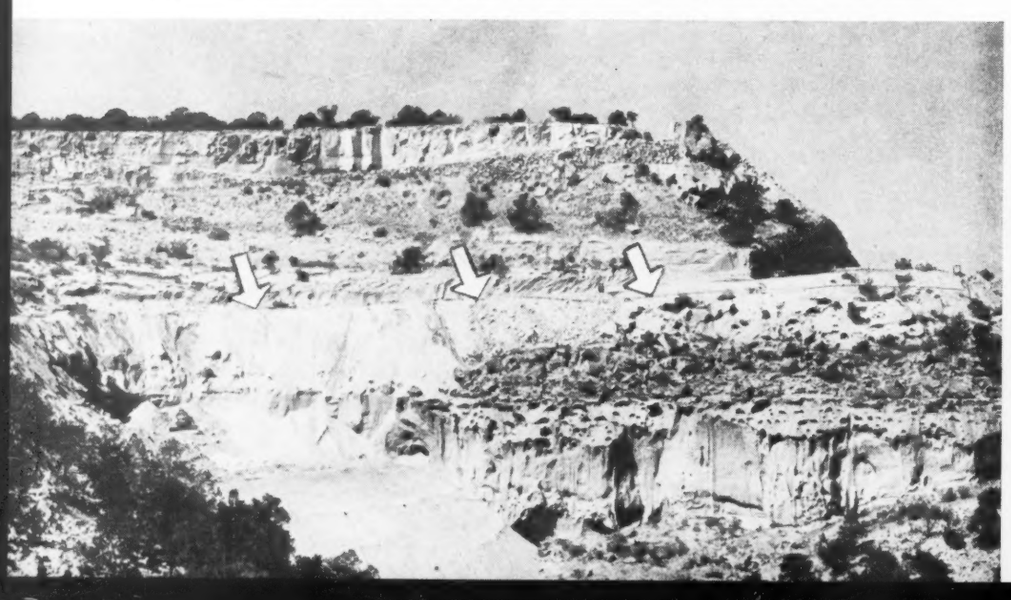
Assistant Office Engineer, New Mexico State Highway Department. (From information furnished by Ural S. Armstrong, project engineer.)

THE PLACE WHERE THE ATOMIC BOMB was developed and perfected was high up in the Jemez Mountains (7,400 ft. elevation) in the north central part of New Mexico. The former road into this area was a narrow gravel-surfaced state highway built to serve the Los Alamos Ranch School. Wild turkey and deer abounded in this area. It was a perfect setting to develop man's most modern weapon in country that looked as if man had never set his foot there before. Los Alamos is located on a mesa halfway up the side of the Jemez Mountains and to construct a road capable of servicing a bustling city of 6,000 persons engaged on the atomic bomb project, while that community was being built, and to make it an all-weather road, was an engineering feat of no mean ability.

The road to the Los Alamos school then being used had grades up to 18 per cent, sharp hairpin curves, very limited vertical and horizontal sight distances and perpendicular cliffs just a stone's throw from both sides of the route. The stretch from Otowi to Los Alamos, a distance of 6.3 mi. on the new road, provided a challenge to engineers of the New Mexico State Highway Department. The location engineers first moved on to the job trying to find a line on which a road could be built and by clinging to the sides of rock cliffs they were finally able to stake out the line.

Plans were rushed to the drafting tables where the highway designers burned the midnight oil figuring the heavy fills and extensive rock cuts necessary to construct this most vital road, designed as the Zia Project Access Road. During construction many difficult engineering problems were encountered along-

DIFFICULT CONSTRUCTION TERRAIN (below) presented challenge to engineers and contractors on Atomic Bomb Access Road (location indicated by arrows) in New Mexico.



TRACTOR-HAULED SCRAPERS handle contractor's grading operations along edge of steep slope which made road construction difficult.

ALMOST PERPENDICULAR are inner faces of canyonside cuts made to accommodate road location.

side the perpendicular cliffs in the lower canyon.

During some previous construction there had been placed a concrete retaining wall. This wall was vertical for some 20 ft. and keyed into the solid malpais. It was built on reverse curves with a sheer drop of 150 ft. to the canyon floor. At this point the old highway was about 20 ft. wide with solid rock or malpais bluff on the inside, 40 to 50 ft. high. As it was necessary for this retaining wall to remain in place and for the roadway to be widened throughout this section, extreme care had to be taken to protect the wall during blasting operations. This was accomplished by using some salvaged bridge timbers, extending the ends out over the wall, using deadmen and cables to anchor them in place

(Continued on page 158)

HAIRPIN TURNS and reverse curves were required by extremely rough topography. In foreground bulldozer and tractor-scraper are handling earth-moving.

HARD MATERIAL, called malpais (below), required blasting and removal by power shovels of 1 and 2-cu.yd. capacity.

➤ **ACCESS TO ATOMIC BOMB PROJECT** is finally provided by carving out road from face of canyon.

Material-Handling Devices

Speed Receipt, Processing and Shipment of Equipment and Supplies From Navy Base in California to Seabees in Pacific Areas

THE ADVANCE BASE DEPOT, Hueneme, which occupies approximately 600 acres, is located on the Pacific Coast about 55 mi. north of Los Angeles. It includes a ship basin with berthing space for nine Liberty ships and ramp loading facilities for two LST's. The storage area is north of and adjacent to the ship basin, and includes, besides open storage space, 14 major and 21 minor warehouses. The depot is part of the Naval Base, Hueneme, and is located adjacent to other parts of the Naval Base, to Advance Base Depot receiving barracks, Camp Rousseau, and to the Acorn Assembly and training detachment.

Seabee Equipment and Supplies

The purpose of the depot is to receive, stock and ship all material and equipment required by construction battalion—Seabee—activities in the overseas Pacific area. This includes construction material such as lumber, plywood, cement, nails, bolts, pipe and fittings, reinforcing rods, steel shapes, paint, sheet metal, etc.; also all kinds of light and heavy construction equipment including cranes, trucks, tractors, power shovels, piledrivers, excavators, graders, picks, shovels, and other small plant. Other items include electrical generators, water purification units, power plant equipment, machine shop and garage installations, messing and scullery gear, hospital facilities and huts of various types. In addition, spare parts for all equipment are handled and shipped out by the depot.

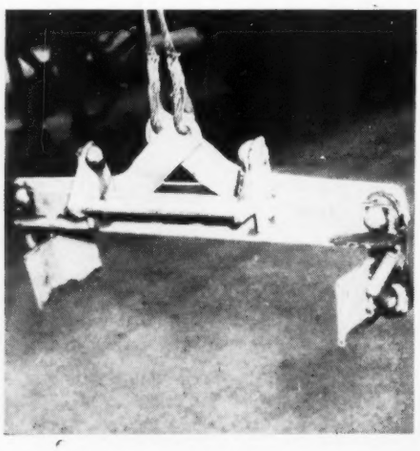
At the peak of operations, the depot employed 8,000 persons who

IMPROVISED BOOM in form of length of pipe attached to fork lift of Clark electric battery four-wheel truck proves a convenience in uncrating equipment and handling miscellaneous low-lift and material-handling jobs. Boom has short pipe length welded to inner end to form T which bears against under sides of forks on truck.

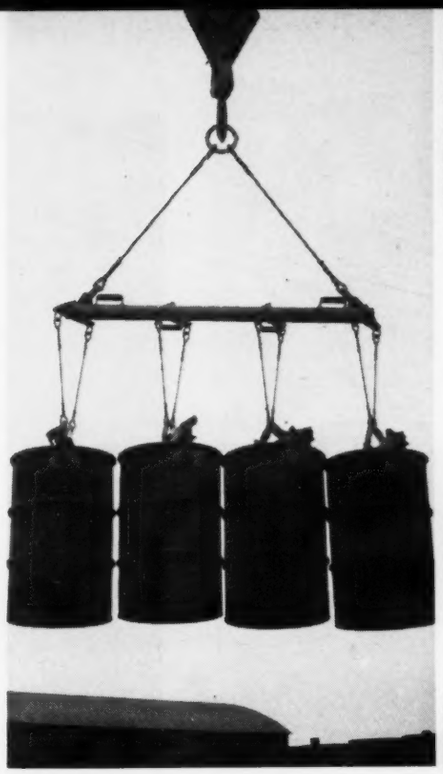
BOX AND CRATE HOOKS of various sizes facilitate handling of packaged loads. Bent, U-shaped hooks with pointed ends are reinforced by welded angle-iron stiffeners. Application of these hooks to lifting crate is shown in another illustration.

"UNSCREW DRIVER" (below) for removing lag screws from wood crates consists of electric drill mounted in wheel carriage with means for adjusting height at which it is desired to operate tool. Drill, equipped with head for engaging square end of lag screw, is run in reverse and operates as nut runner.

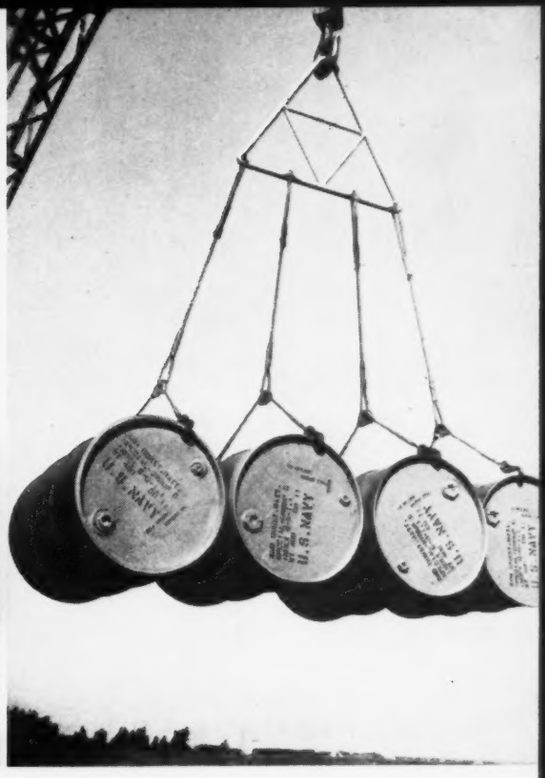
PICKUP TONGS (below) embodying clamping device operated by pull of hoist line as load is raised make it easy to handle metal gasoline and oil drums so widely used by Seabees in Pacific war theaters.



VERTICAL LIFT on Ross carrier makes it possible to load or unload gasoline drums, handling four units at a time with slings and clamps that grip surface of containers.



MULTIPLE SLINGS of two types make it possible to handle four gasoline drums in one operation. Each drum, filled, weighs 400 lb.

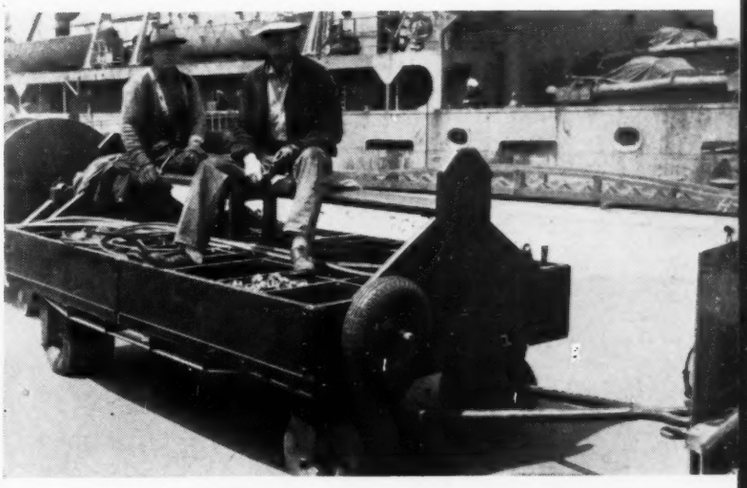


were engaged in receiving, handling, storing and shipping stock, and in the several clerical functions necessitated by a storage and shipping setup of such magnitude. During 1942 an average of 17,500 long tons were shipped per month; during 1943 the monthly shipments totalled 65,000 tons; and the tonnage shipped in 1944 amounted to more than 125,000 per month. In 1944, 25 shiploads of stock were being sent out each month.

Procurement of advance base material and equipment was effected

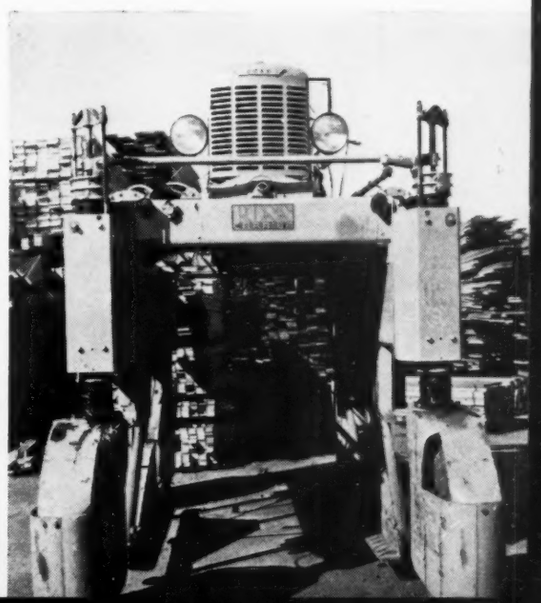
Official Navy Photos

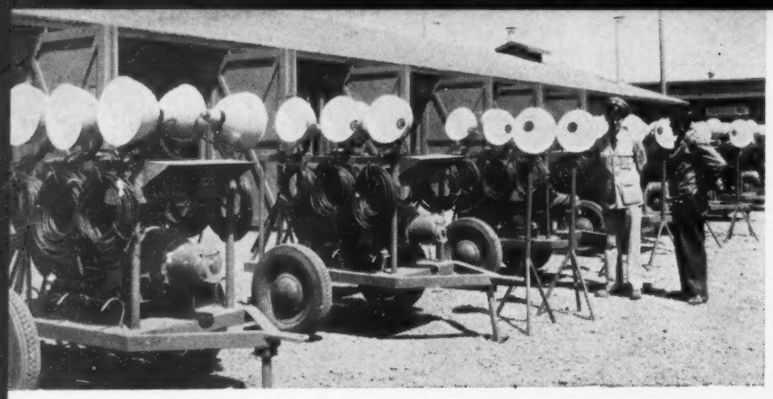
→ SHIP RIGGERS TOOL KIT, divided into compartments and mounted on dual pneumatic tires, is easily towed to points of use by stevedore truck and prevents loss of time by mechanics for trips back to shop for some forgotten tool or fitting.



ACCIDENTAL CONTACT WITH HIGH TENSION WIRES by boom of truck-crane is robbed of danger by rigging non-conducting wood guard frame around end of boom (below) to prevent short circuit and possible injury to operator. Another safety feature is guard rail along platform around cab of machine.

SAFETY FEATURE is applied to this Ross lumber carrier by encasing front wheels in metal fenders.



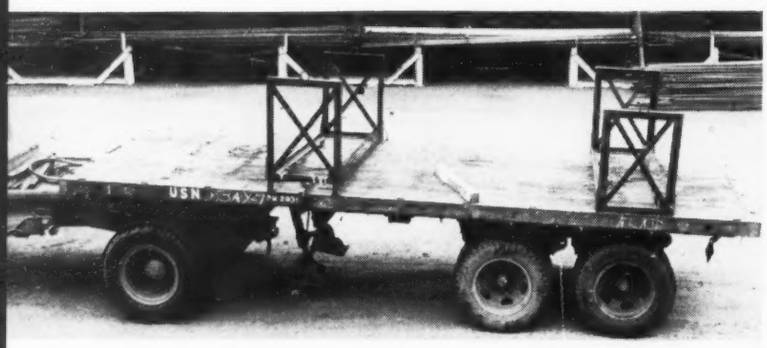


PORTABLE LIGHTS in groups of six are carried on two-wheel rubber-tired trailer carriage on which is mounted 5-kw. electric generator driven by gasoline engine. Lamps are detachable and by means of long electric cables, shown in coils under each unit, may be used at distances of several hundred feet from generator.

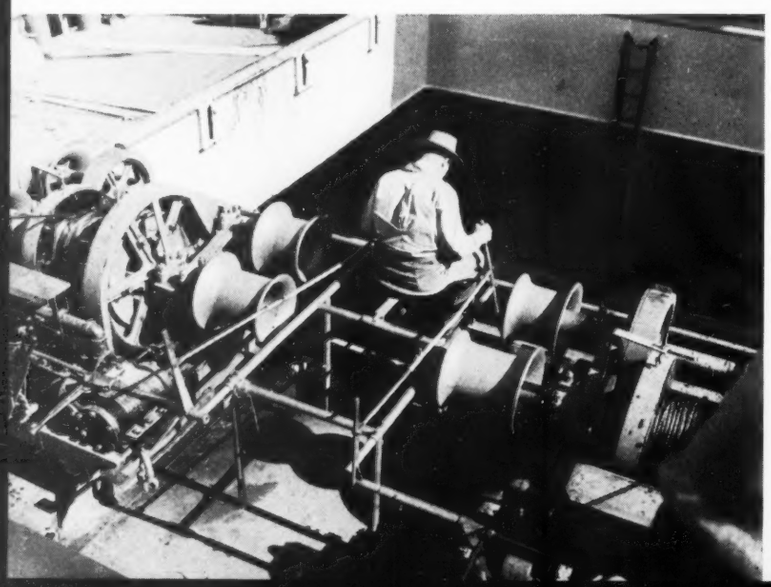
SCRAP METAL PICKUP around yards and docks is accomplished by electric magnet hung from crane arm on rear of four-wheel truck carrying 300-amp., 50-volt generator. Height of magnet above ground surface is adjusted by cable from hand winch.

DAMAGE TO WIRE ROPE SLING by which heavy tractor is loaded aboard ship is prevented by use of slotted steel shoe with curved surface (indicated by arrow) to prevent sharp bend and cutting of strands.

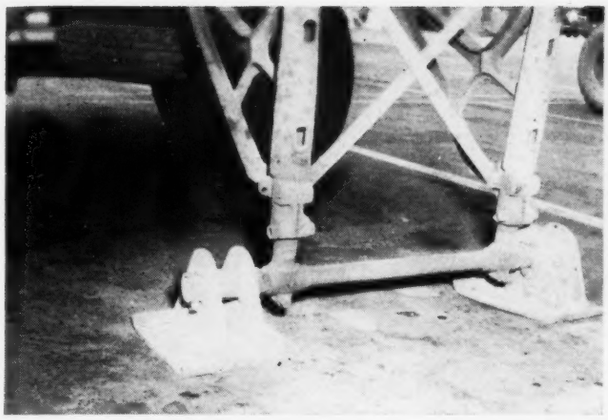
AN AID TO NIGHT WORK (below) of all types in the handling of supplies is this portable floodlight tower equipped with six lamps and reflectors mounted on four-wheel truck carrying 5-kw. generator driven by gasoline engine. Height of floodlights on column telescoping into supporting steel frame-work can be regulated by cable from hand winch on front of carriage, giving vertical range of from 15 to 30½ ft.



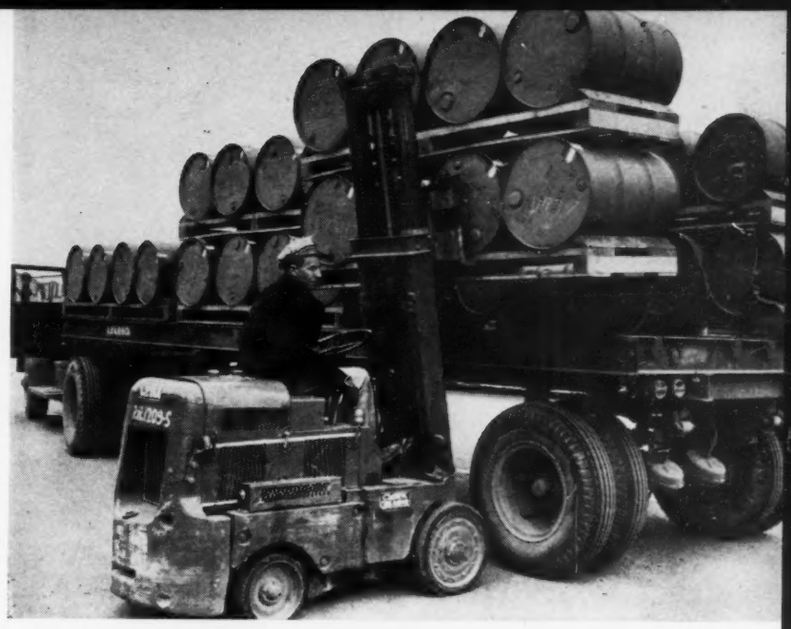
FOR LOADING AND UNLOADING PIPE these steel racks on floor of trailer prove convenient in allowing load to be picked up as unit by attaching slings to frames. To top members of frames eyes are welded to engage hooks of slings.



VISIBILITY FOR OPERATOR of winch raising cargo or lowering it into hold of vessel is provided by hand levers with extension arms to engine controls and seat from which operator can look directly down into hold and spot load accurately.



TWO-LEGGED SUPPORT for end of trailer allows truck to be detached and put to use elsewhere during unloading. Broad steel shoes on horizontal shaft provide ample bearing area to carry load and protect pavement surface from damage.

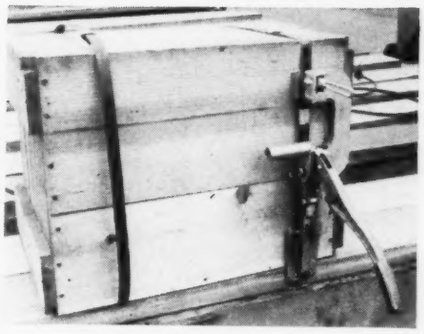


MULTIPLE LOAD of gasoline drums, carried on pallet boards in tiers of four, is handled by fork lift on Clark carloader.

by the Advance Base Division, American Furniture Mart, Chicago, Ill. It was made, to a great extent, in the shape of what are called functional components. These are assemblies of which there are more than 200 different varieties of material and equipment required for every functional need of an advance base. Among them are functional components for communication units, hospitals, camps, ship and repair units, automotive repairs, maintenance and stevedoring detachments. More than 7,000 different standard items are procured, and they are all listed as either (1) bureau scheduled items, (2) stock items; or (3) bureau special items.

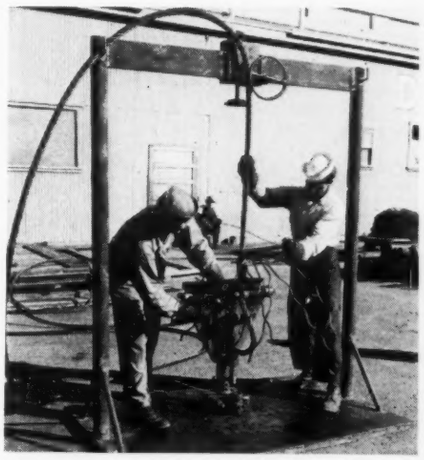
Due to their high unit value, critical manufacturing requirements, and low peace-time resale value, the strictest kind of control was exercised over the purchase of items of

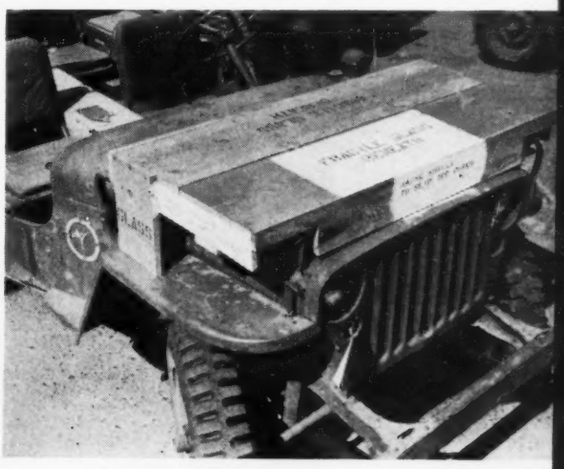
(Continued on page 172)



METAL BANDS on wood crates ready for shipment overseas are tightened by device here illustrated.

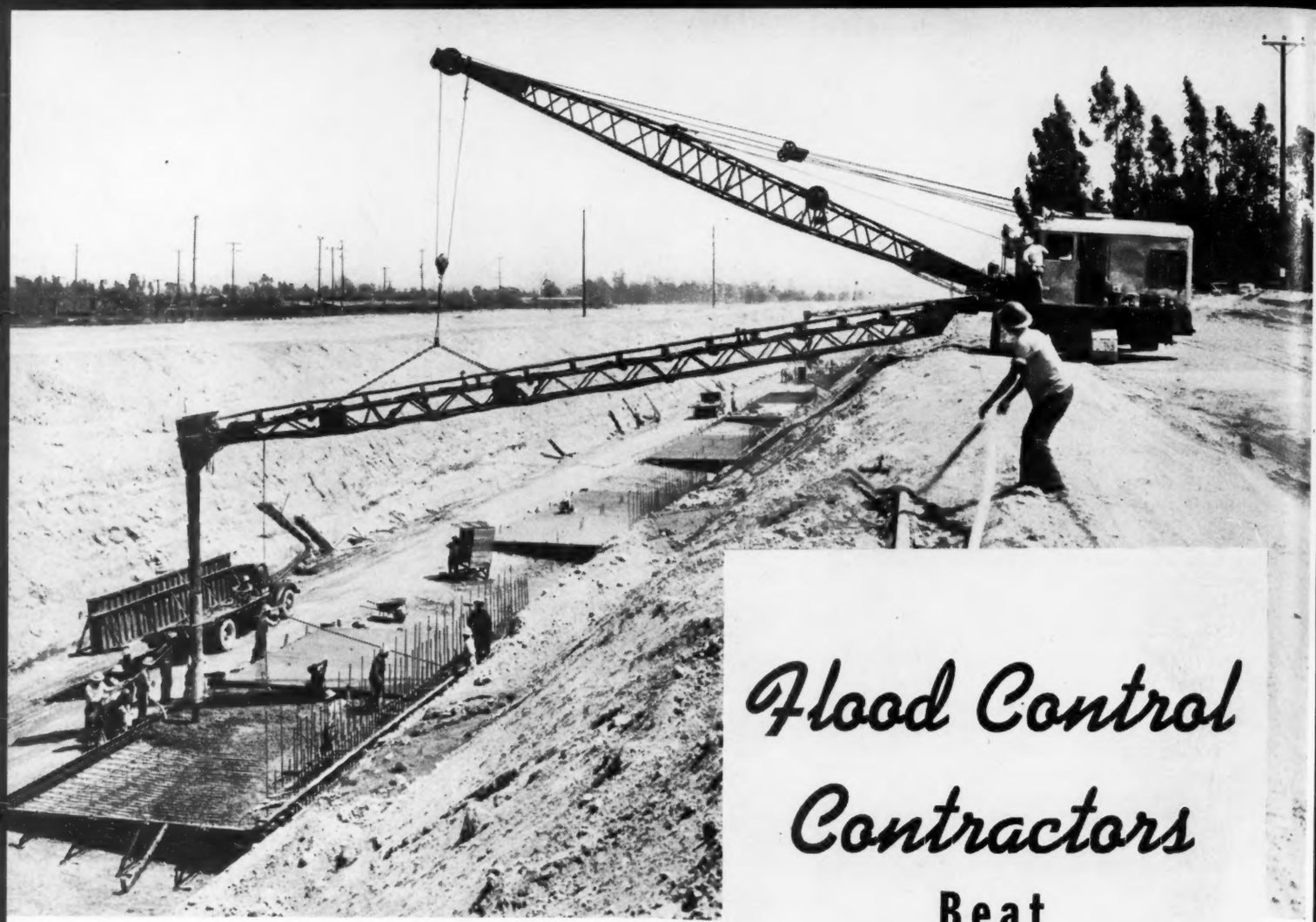
PROTECTION FOR HOOD OF JEEP is afforded by removable wood cover.





PORTABLE CABLE SPLICER speeds up operation of joining lengths of wire rope.

BOX CAR UNLOADER and crate handler (below) is developed by mounting boom with long cantilevered end on framework attached to dock "mule." Cable from winch passes through pipe boom for raising and lowering loads. Lifting capacity is 3,000 lb.



Flood Control Contractors Beat California Rains

FAST PLACEMENT is achieved by feeding concrete direct from transit-mix trucks into endless conveyor belts supported by booms of crawler cranes. No trouble with mix separation is experienced. Second crane-conveyor rig is at work in background.

BELT CONVEYORS carry concrete to elephant trunks through which it drops into invert slab forms in deep cut section of Lytle Creek channel. Metal end forms to which expansion joint material is fastened are left in place to permit continuous concrete work along one side of channel. Crane at right is placing metal heel forms for invert slab.

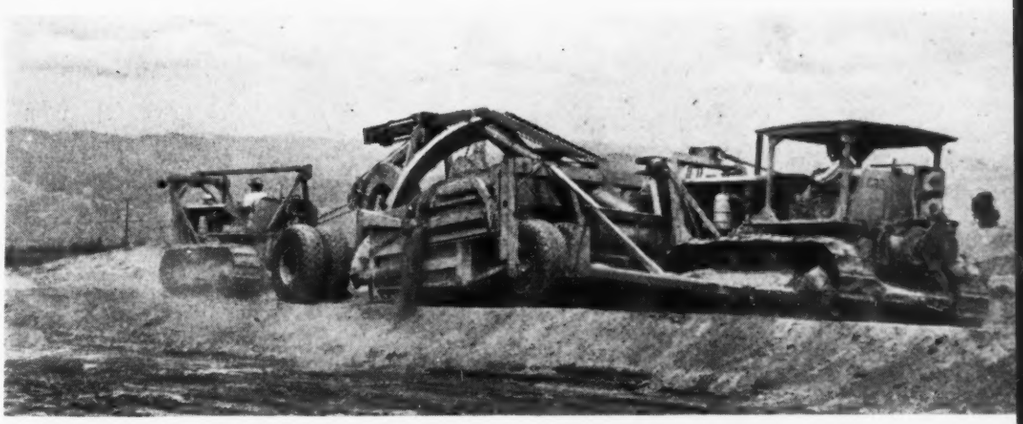
DOWNGRADE LOADING of Carryalls is time-saver on Lytle Creek excavating work. Piled on hillside in background, excavated material is later used as backfill.

MILITARY OPERATIONS against Japan, demanding uninterrupted railroad service between San Bernardino, Calif., and West Coast points in Southern California, necessitated a race against seasonal rains in the construction of the Lytle and El Cajon Creeks flood control project now in the clean-up stage. Started June 30, the 3-mi.-long concrete channel and 14 mi. of groin and levee protection area were ready for water run-off November 20, with clean-up scheduled for completion by mid-March.

Levees, groins and channel of the $8,387,765 project were designed to control floods which, as late as 1943, with war traffic on steady increase, washed out main-line tracks of two vital railroads, inundated highways and virtually halted the flow of men and materials to Southern California ports.

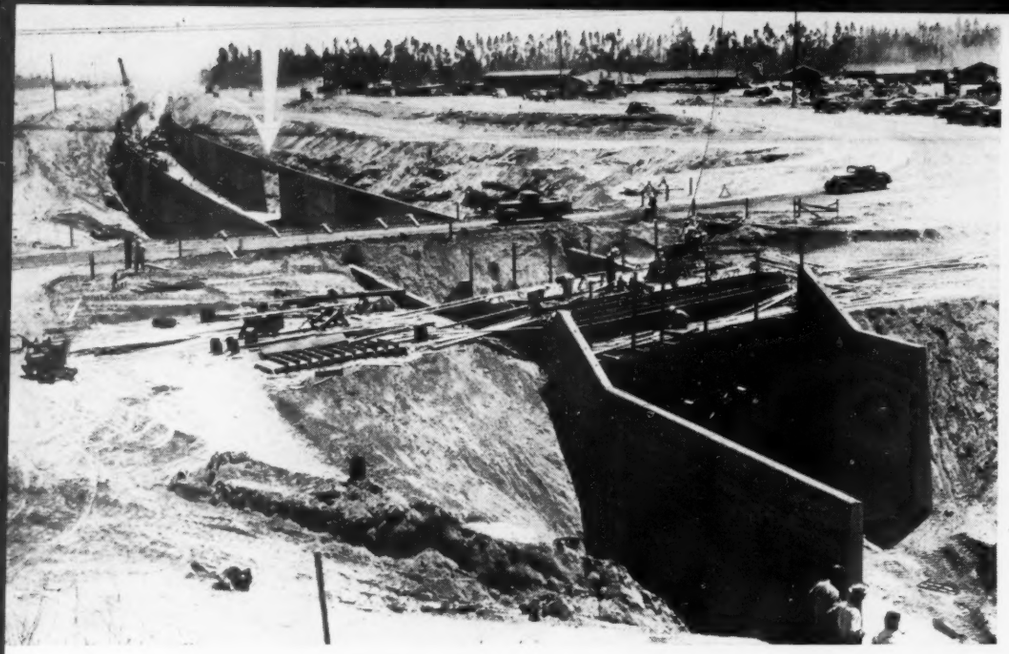
Under direction of the Los Angeles District U. S. Engineer Office, headed by Col. Rufus W. Putnam, the contractors concentrated numerous fleets of large capacity equipment and approximately 860 men on the job. They excavated 1,804,000 cu. yd. of earth; placed 11,340,000 lb. of reinforcing steel, 502,000 tons of quarry and derrick stone, 141,324 cu. yd. of concrete, and 71,000 cu. yd. of grout, and backfilled 1,320,000 cu. yd. in 4 months and 20 days.

Contractors on the levees, bypass and groins were Winston Brothers



RACING ARRIVAL of winter rains, 12-yd. Carryall pulled by Caterpillar tractor is pushed by bulldozer to obtain capacity load in runs of 100 ft. or less on flood control project.

ABUTMENTS AND ADJACENT WALLS of La Cadena Ave. bridge are ready for forms. Note steel in place before back forms are built.



ACCESS TO PAVED CHANNEL from nearby camp is provided by temporarily omitting one wall panel. Forms are being placed for deck of highway bridge.

TEMPORARY SUPPORT for main transcontinental telephone cables is provided during construction by large crane boom which spans channel excavation.

Co., Utah Construction Co., and Vinnell Co. Their contracts totaled $2,768,432. For construction of the channel, intake and outlet structures, contractors were Bressi-Bevanda Constructors, Inc., and Macco Construction Co. Their combined contracts totaled $2,528,350. Steel and supply contracts approximated $3,090,983.

A system of levees, groins and a concrete channel now will divert flood flows from the developed area in the vicinity of San Bernardino and Colton, Calif., and carry them to Warm Creek just above its confluence with the Santa Ana river.

Capacity of the reinforced-concrete channel 3 mi. long and 40 ft. wide with walls 20 to 25 ft. high, is 30,000 cu.ft. per sec., with an overflow bypass capable of handling an additional 10,000 cu.ft. per sec. Because of wartime scarcity, the design was made to conserve critical materials, with the use of reinforcing steel curtailed to the fullest possible extent consistent with safety.

Levees and groins are composed mainly of material excavated from the wash areas and are faced with grouted stone on the channel side. They are from 10 to 20 ft. high, have a crown width of 18 ft., and side slopes of 1 on 2 on the land side, and 1 on 2.25 on the channel side.

Quarry stone facing is 1.6 ft. thick at the slope top and 2 ft. at the toe and is completely grouted. The facing extends approximately 10 ft. below the stream bed elevation and, to protect the toes from scour, quarry stone is placed over the grouted stone facing at the toes, the voids being filled with stream-bed material.

STRAIGHT SECTION (below) of Lytle Creek channel is completed, with ramp still to be removed. Compacted backfill is placed behind both walls simultaneously to equalize stresses in two sides of reinforced-concrete structure.

PREFABRICATED WALL FORMS (below) and completed concrete sections alternate in right wall of this section of Lytle Creek channel in San Bernardino, Calif. Capacity of 3-mi.-long reinforced concrete channel is 30,000 cu. ft. per sec.

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Remote Expenses

When Tractor Conn does not live up to his contract, it is very elementary "fireside law" that the owner may collect damages for breach of contract.

In a pertinent ruling of the Kansas Courts, the evidence showed that Tractor Conn, by removing the shelving from the old building before the new building was ready for occupancy, compelled the owner to advertise his removal from one building to another, which he would not have had to do if Conn had carried out his agreement. The owner claimed the advertising expense by way of damages.

"My lawyer tells me that the damages which can be collected must be the natural and 'proximate' result of the breach of contract, and your advertising expenses are too 'remote' to collect," Tractor Conn told him, and the Kansas Supreme Court so ruled in Walrath vs Whittlekind, 26 Kan. 482.

The Case of the Non-Resident Contractor

Many of the states have laws providing that a corporation incorporated out of the state cannot do business in the state without complying with certain conditions. It is often a vexing question to decide whether a "foreign" corporation is doing business within a certain state or not.

A case along this line is reported in 256 Southwestern Reporter, 845, where the evidence showed that Tractor Conn incorporated a company in Missouri, contracted to do certain work in Arkansas, and sublet part of this work to a Kansas contractor. Conn's company shipped the material for the work into Arkansas billed in its own name, and also furnished some of the required material to the Kansas subcontractor.

"Your contract is invalid as you did not comply with the Arkansas law requiring that you file your articles of incorporation in Arkansas," it was contended. The Arkansas Supreme Court, in the case referred to, ruled that this point was well taken.

The Case of the Missing Vessel

Tractor Conn had bought lumber F.A.S. (free alongside) a certain vessel. At the proper time and place the specified vessel, through no fault of Conn, was not there to load the lumber.

"Well, put the lumber on the dock and I'll take chances on getting a ship," Conn suggested.

"No, if the named ship is not there to receive the lumber, that relieves me from my obligation to deliver," the seller retorted, as the price of the lumber had gone up in the meantime.

"As long as the absence of a ship puts no additional burden on you, you can't crawl out that way. If you pile the lumber on the dock and get your pay you needn't worry about the vessel," Tractor Conn maintained, and the United States Circuit Court of Appeals ruled in his favor.

"Of course, if there was a stipulation that delivery is to be F.O.B. a certain vessel and the contract could not be performed without the presence of the ship, the case would be different," the Court stated.

More Legal Adventures of Tractor Conn Next Month

CONCRETE ARCH ROOF

Over Navy Testing Basin Is Insulated to Check Condensation

By **HENRY GARNJOBST, Jr.**, American Lumber and Treating Co.

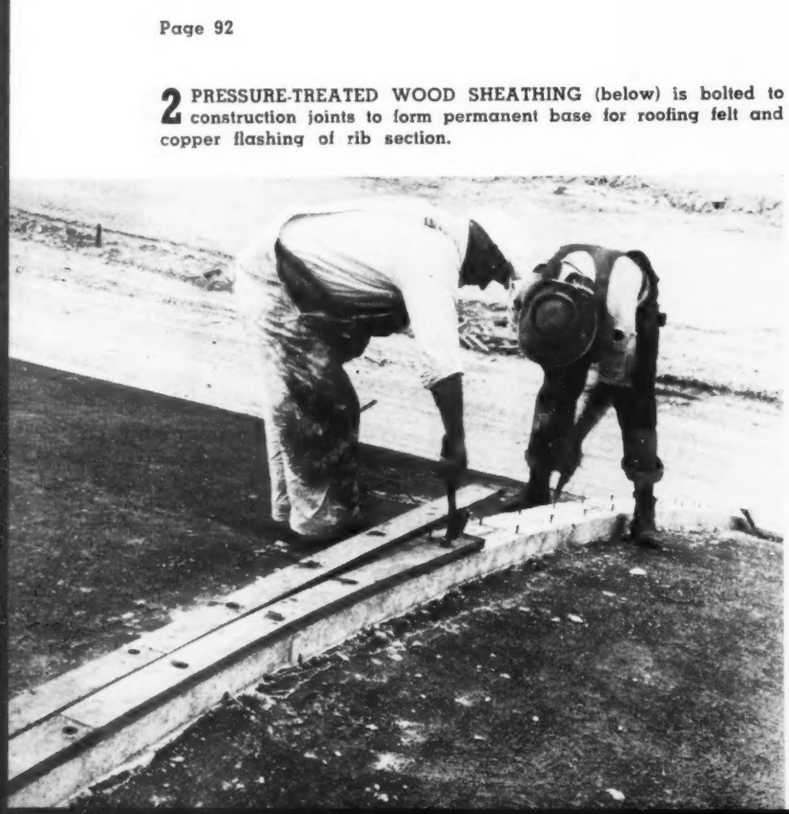
1 EXTENSION TO MAIN BASIN INCLOSURE of Navy's Taylor Model Basin at Carderock, Md., being completed by Turner Construction Co. of New York, incloses main testing basing in 3,000-ft.-long, three-hinged, concrete barrel-arch. Insulation and built-up roofing are laid on curved deck of arch and flat deck of fitting room building, at right, by roofing subcontractor, Lewis & McDowell of New York.

BUILT-UP ROOFING APPLIED to the Navy's 3,000-ft. Taylor Model Basin at Carderock, Md.—including a newly constructed 1,800-ft. extension to the concrete barrel-arch test basin—is designed to eliminate condensation difficulties experienced with wood fiber insulation used on the interior of the original structure.

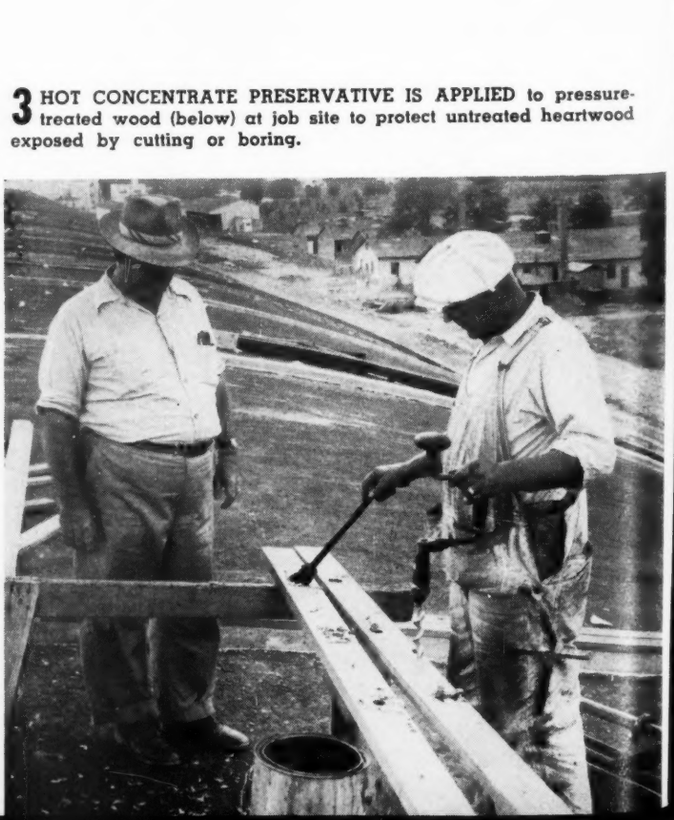
Completion of the 1,800-ft. extension to the model basin, and additional shop facilities, will permit peacetime Naval research on hull and power plant characteristics of Naval vessels, seaplanes and torpedoes to advance at an even faster pace than during the war. Turner Construction Co., of New York, is the general contractor on this project and Lewis & McDowell, also of New York, is the roofing subcontractor.

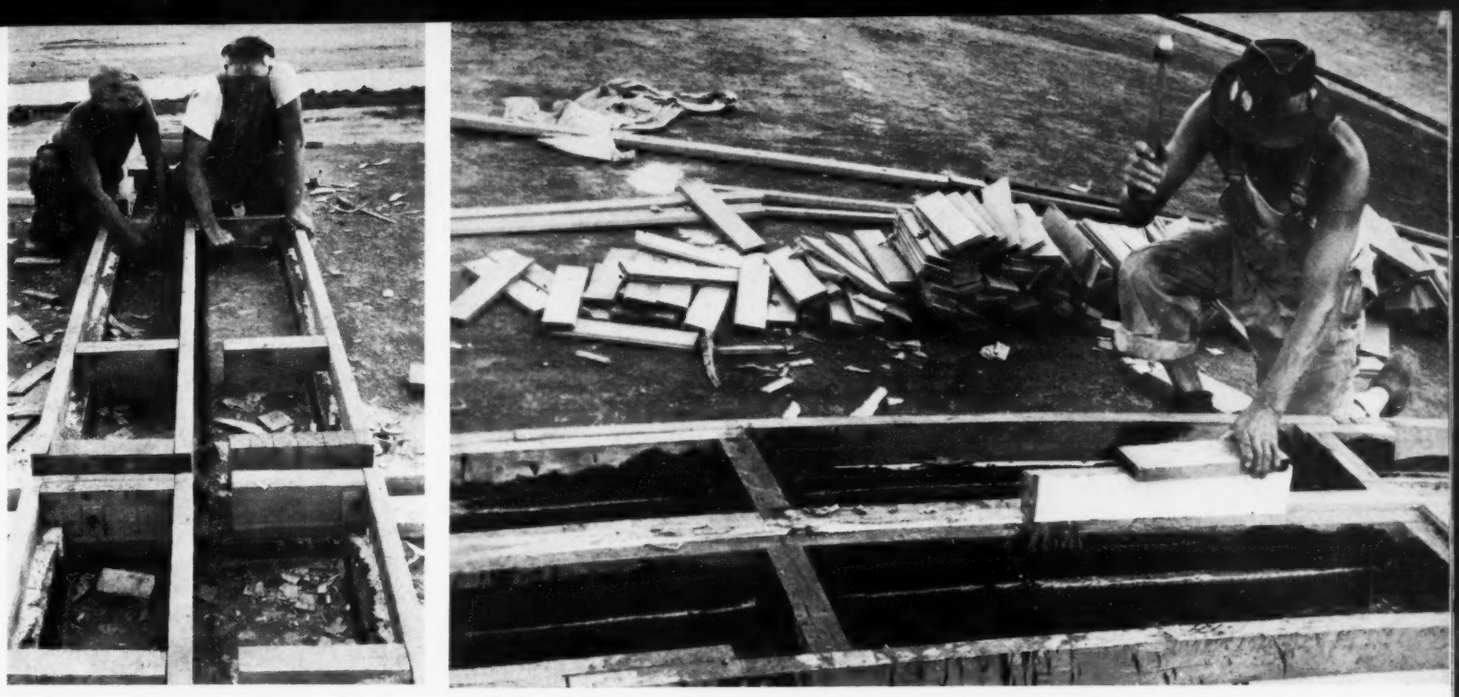
Bedrock Foundations—Located on the north bank of the Potomac River, 11 mi. from the Navy Department in Washington, the 1,890x 6,240-ft. model basin site provides a solid bedrock foundation needed for the close construction tolerances

2 PRESSURE-TREATED WOOD SHEATHING (below) is bolted to construction joints to form permanent base for roofing felt and copper flashing of rib section.



3 HOT CONCENTRATE PRESERVATIVE IS APPLIED to pressure-treated wood (below) at job site to protect untreated heartwood exposed by cutting or boring.





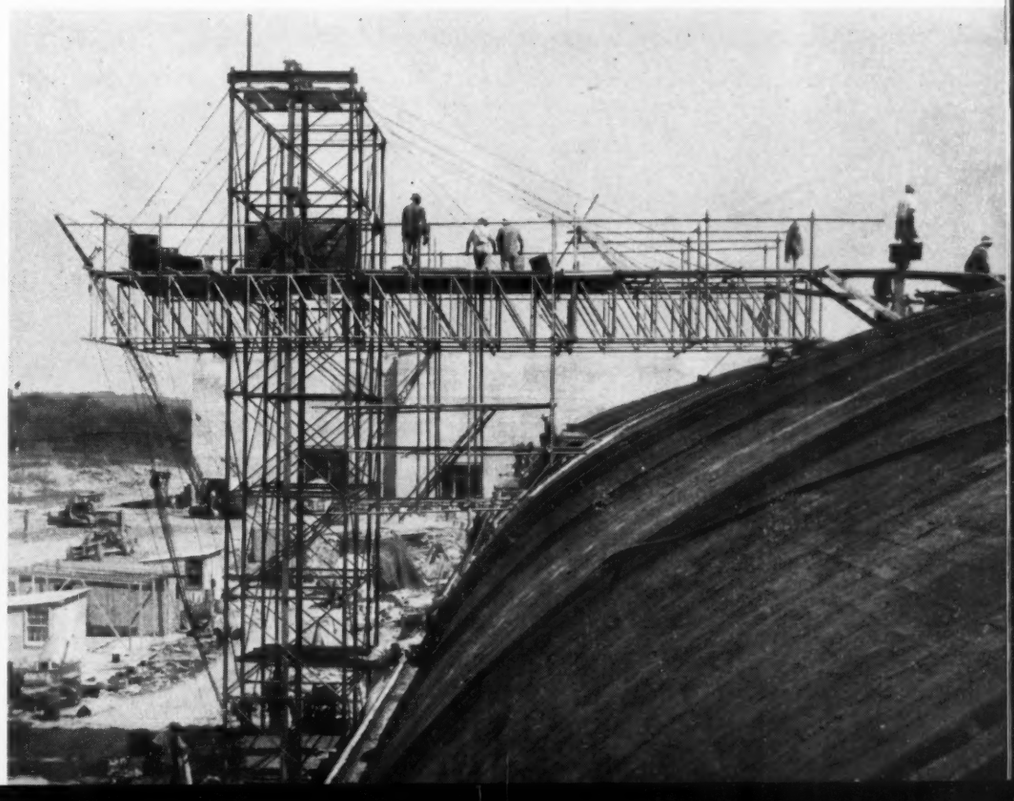
4 WOOD FRAMEWORK FOR RIB SECTION at expansion joint is bolted to zinc-coated metal clips (left). Insulation is forced into space directly above expansion joint (right).

specified for the main basin structure. This structure incloses the shallow-water, deep-water, and high-speed testing basins in a 3,000-ft., three-hinged, reinforced concrete barrel-arch without ribs or projections, featuring articulated Mesnager-type hinges. The Mesnager-type hinge was used for the first time in this country when the original structure was built. (*Construction Methods*, May 1939). The arch structure is 118 ft. wide and has no openings for natural light.

Other Structures—Part of the present construction is a 217x258-ft. fitting room building of reinforced concrete on concrete foundations and footings. This building, adjoining the extension of the basin inclosure, has basement, ground and mezzanine stories. At the opposite end of the barrel-arch—adjoining the original 1,200-ft. section—is a rectangular inclosure housing a turning basin connected with the shallow-water basin. This structure includes shop, office and laboratory buildings of rigid-frame design totaling 871 ft. in length and running parallel with the basin inclosure. An electrical substation and water purification, sewage disposal and heating plants are also part of the existing structure.

Universal Atlas high-early-

5 ARTIFICIAL RIB EFFECT is created by sheathing expansion joint and covering with roofing felt and 16-oz. copper flashing secured by 1½-in. copper cleats.



6 CANTILEVER HOISTING TOWER is constructed of Chesebro-Whitman pipe scaffolding by roofing subcontractor to carry materials to top of barrel-arch roof deck.

7 HOLES FOR EXPANSION BOLTS are drilled through 1 x 3⅝-in. nailing strip into concrete roof deck. Deck is previously primed and layer of vapor-seal felt mopped down. Because any decay would allow insulation and roofing to pull loose from curved concrete deck, lumber is pressure treated with Wolman Salts preservative at plants of American Lumber and Treating Co.

8 FIRST TWO PLIES of ½-in. Johns-Manville insulating board are laid in hot asphalt between treated lumber nailing strips, breaking joints between layers.

9 TOP SURFACE OF SECOND PLY of insulating board (below), and nailing strips, are hot mopped prior to laying third ply. Top ply is laid in sheets extending over two spacings of nailing strips. Area below scaffolding is mopped and allowed to dry prior to application of troweled plastic roofing.

strength portland cement was used for the three-hinged arch which has a clear span of 110 ft. 8 in., is 8 in. thick at the crown and 12 in. thick at the abutments. The crown hinge is reinforced by eight ¼-in. round, corrosion-resistant steel bars per foot, and the abutment hinges by eight ⅝-in. round, intermediate-grade carbon steel bars per foot.

Concrete was poured in 60-ft. sections, using a traveling arch form. A bucket and crawler crane were used to place the concrete as well as the arch steel which was fabricated on the ground in mats 10 ft. wide and half the length of the arch. Expansion joints are spaced every 120 ft. on centers. Construction joints, placed at 60-ft. centers in the original 1,200-ft. structure proved inadequate to localize effects of contraction and expansion, so the design was modified in the new structure to provide construction joints at 30-ft. centers between expansion joints.

The major difference in the design of the 1,800-ft. extension and that of the 1,200-ft. original basin structure is in the insulating of the top roof surface and the laying of built-up roofing. The arch of the original structure was finished with a 2-in. layer of wood-fiber insulation on the inside and the concrete roof deck was given a pyro-bituminous coating on the outside, then painted with aluminum paint.

Insulation Caused Condensation

Although the building is ventilated and constant temperature is maintained by a series of steam heaters and ventilators, exterior temperature variations and water evaporation from the testing basins caused condensation in the wood-fiber insulation at a point where the temperature of the insulating material was lower than the dew point corresponding to the relative humidity and temperature of the interior air. Condensation supplied moisture for growth of decay fungus in the wood fiber, caused the binder to deteriorate and endangered testing apparatus by condensate drip. This problem was partially solved by spraying asbestos fiber to a thickness of about ½-in. over the existing insulation, as a stop-gap measure only.

A 2-in. layer of wood-fiber sound-absorbent material, which acted as a form at the time of pouring the concrete arch, lines the underside of the 1,800-ft. extension, although a portland cement binder

rather than the original binder is used.

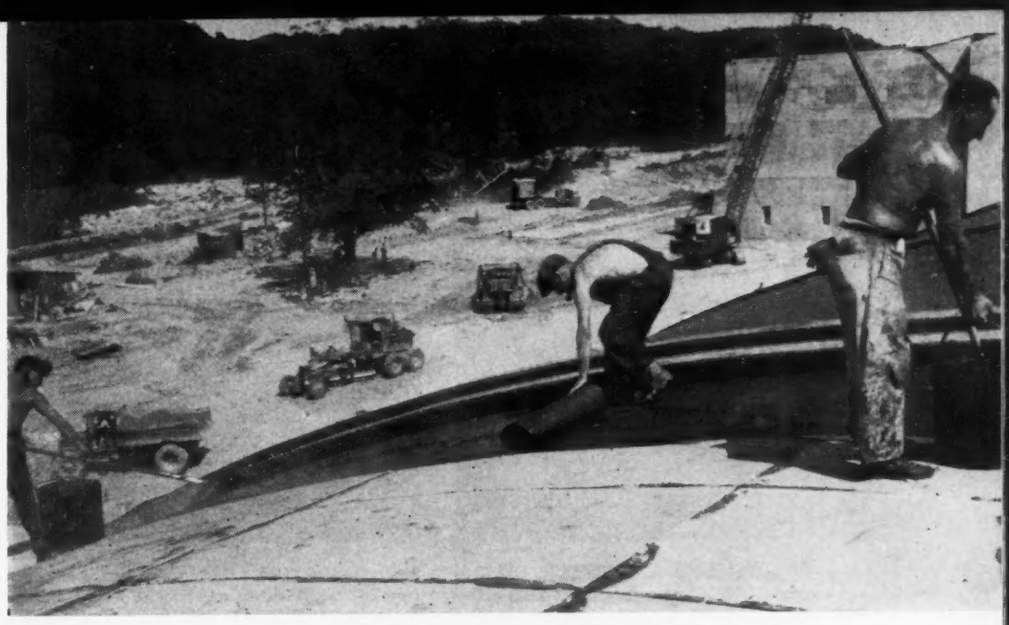
After an asphalt primer is sprayed on the concrete deck of the extension, one layer of Johns-Manville 15-lb. asphalt-saturated, vapor-seal felt is mopped down at right angles to the long dimension of the basin building in continuous strips 32 in. wide, lapped 2 in. Over this are placed 1x3⅝-in. Ponderosa pine nailing strips. As any deterioration of these nailing strips would allow insulation and built-up roofing to pull loose from the curved concrete deck, all lumber is pressure treated to a retention of 0.35 lb. of Wolman salts preservative per cu. ft. of wood, at plants of the American Lumber & Treating Co. Nailing strips are laid parallel to the long dimension of the building on 4-ft. 3⅝-in. centers. These strips are secured with one-piece Rawl-Drive steel expansion bolts. Holes are drilled through the wood nailing strips and concrete roof deck in one operating and the expansion bolts are driven on approximately 2-ft. staggered centers.

Three plies of ½-in. Johns-Manville insulating board are installed over the vapor-seal felt after mopping. The two lower plies are laid in hot asphalt mopping between the nailing strips in 23x48-in. sheets, breaking joints with the lower layer. The top ply, laid in 48x103-in. sheets, extends over two spacings of wood grounds. All plies are mopped to each other, the top ply also being fastened to the Wolmanized nailing strips with 3d zinc-coated steel nails spaced 6 in. on centers.

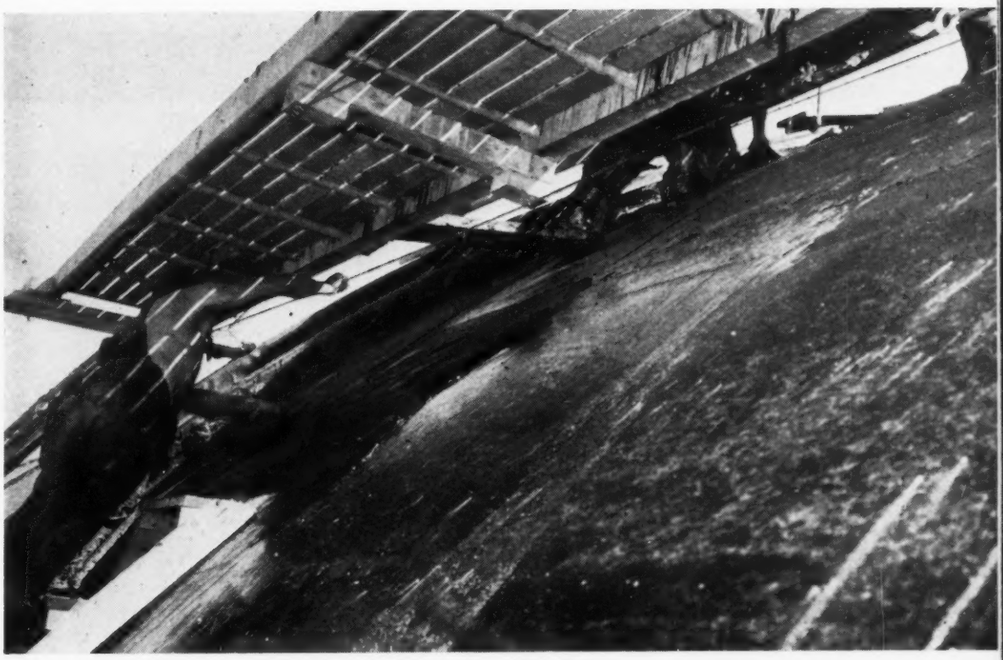
Two Methods for Applying Felt

Depending upon the pitch of the roof, built-up roofing for the concrete arch is applied in two ways. Where portions of the roof have a slope of less than 6 in. to the foot (approximately two-thirds of the roof area) one layer of 15-lb. felt is laid at right angles to the long dimension of the building in a hot mopping over the top ply of insulating board, lapping ends and edges 2 in. Three succeeding sheets of the same weight of felt are applied with 22-in. laps over, and parallel with,

(Continued on page 156)



10 FIRST LAYER OF ASPHALT-SATURATED ROOFING FELT is laid over three plies of ½-in. insulating board. Felt is placed in hot mopping with 2-in. edge lap. This procedure is followed where roof has slope of less than 6 in. per ft.—about two-thirds of roof area. Three sheets are mopped on successively with 22-in. laps.



11 ROOFING FELTS ARE LAID with plastic cement where slope is 6 in. per ft. or more. Top ply of insulating board is primed and allowed to dry, ⅛-in. coating of plastic cement is spread uniformly over area and three successive sheets of felt are laid with 22-in. laps and ⅛-in. coating of plastic cement between each sheet.

12 CONTINUOUS PLY OF FELT is applied to hot-mopped and troweled-plastic areas of arch roof to obviate unpleasant appearance of alternate design which called for 12-in. overlapping of felts at juncture of two areas.

LT. GEN. RAYMOND A. WHEELER, Chief of Engineers, U. S. Army, who spoke on "The Role of the U. S. Army Engineers in the Postwar Construction Program."

J. T. CALLAWAY, Goodyear Tire and Rubber Co., presided at meeting of ARBA Manufacturers' Division, of which he is president.

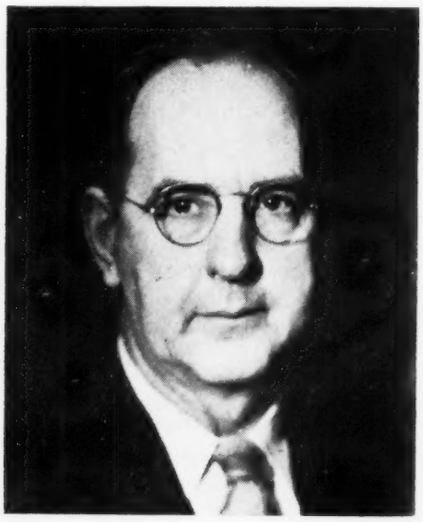
CHARLES W. SMITH, President, Smith Engineering & Construction Co., Pensacola, Fla., directed meeting of Contractors' Division, of which he is president.

Road Builders at Chicago Convention

DISCUSS WIDE RANGE OF TOPICS

MONTES DE OCA, Honorary Life President, Asociacion Mexicana Automovilistica, was Latin American recipient of Pan-American Award for outstanding achievement in development of the Pan-American Highway.

WILLIAM A. M. BURDEN, Assistant Secretary, Department of Commerce, outlined the "Scope and Extent of CAA's National Airport Plan."

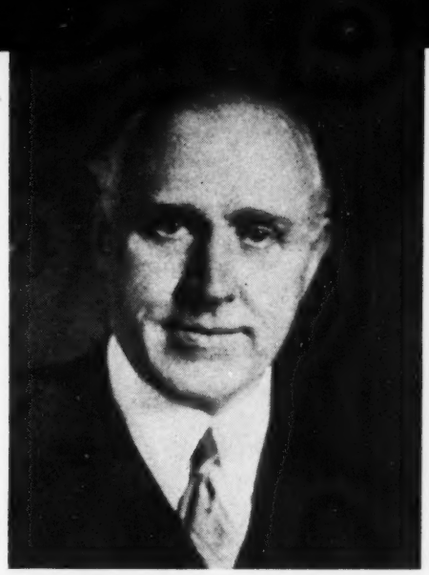


DANIEL O'FLAHERTY, highway economist, Public Roads Administration, presented a paper on "Evaluating Urban Traffic Problems by New Techniques."

MAJ. GEN. PHILIP B. FLEMING (below), Administrator, Federal Works Agency, told about "Federal-Aid Construction in 1946."

HON. JENNINGS RANDOLPH (below), U. S. House of Representatives, had as his topic "Our Hydra-Headed Government."

CMDR. R. B. JENNINGS (below), U. S. Naval Reserve, explained "How to Prevent Pumping of Subgrade Through Paving Joints."

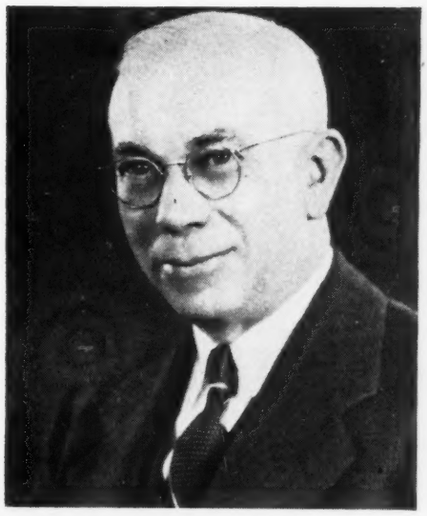


SPENCER MILLER, JR., State Highway Commissioner of New Jersey, spoke on "The Need for Accelerating the Highway Program to Curb Increasing Traffic Fatalities."

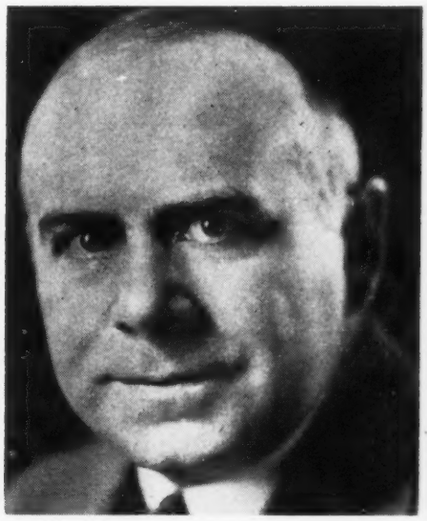
W. BRUCE CHILSON, Chautauqua County Highway Superintendent, New York, reported for Committee on Radio Communications for Highway Operation.

BURTON J. BELL, U. S. Engineer Office, Atlanta, Ga., described "Methods and Equipment Used in Building Rigid and Flexible Airfield Pavements."

Here are a few of the highway engineers, public officials and others who participated in the four-day program, Jan. 14-17, of the forty-third annual meeting of the American Road Builders' Association, which drew an attendance of 2,000 at the Stevens Hotel, Chicago. The convention plans were developed and managed by Charles M. Upham, A.R.B.A., engineer-director. James J. Skelly, contractor, of Media, Pa., was reelected president of the association for 1946.



CHARLES M. ZEIGLER, State Highway Commissioner of Michigan, discussed "The Value of the Stabilized Road in the Highway Program."



THOMAS H. MACDONALD, Commissioner, Public Roads Administration, was North American recipient of Pan-American Award for outstanding achievement in development of Pan-American Highway.

R. B. TRAVER, Onandaga County Superintendent of Highways, N. Y., reported on "Treatment of Icy Pavement and Snow Removal."

PROF. G. P. TSCHEBOTARIOFF (below), School of Engineering, Princeton University, presented a report on "Vibratory and Impact Compaction of Soils."

MAJ. GEN. JULIAN L. SCHLEY (below), Director, Baltimore Aviation Commission, reported for Airport Division, ARBA.

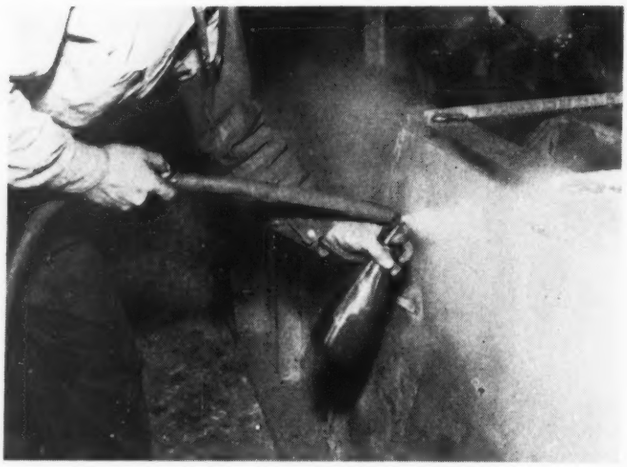
GEORGE W. FIELD (below), Commissioner, Bureau of Community Facilities, Federal Works Agency, described "Planning and Construction of State and Municipal Works."

HOW They Did It

CONSTRUCTION DETAILS
For Superintendents and Foremen

PROTECTION OF OPERATOR of Caterpillar D8 tractor on steep sidehill cut for relocation of Route 99 in state of Washington is afforded by sheet metal canopy, attached by U-bolt clips to curved tubing, to intercept falling rock. Contractors on 2.4-mi.-long project are Leonard & Slate Oregon, Ltd., of Portland, Ore.

OPERATING IN CLOSE QUARTERS, Van Dorn 3/8-in. electric drill (below) equipped with right-angle attachment drills deck beam at Stadium Yacht Basin, Inc., in Cleveland.

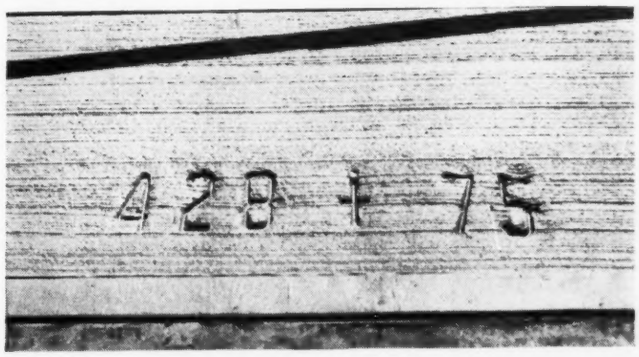


HOMEMADE SPRAY GUN, operated by compressed air, applies special compound to prevent weld spatter from attaching itself to metal. Used in structural shop of Republic Structural Iron Works, Cleveland, Ohio, it is 15 times faster than hand-brushing method. Small-diameter section of pipe in bottle connects with air nozzle. Passing air draws up solution and sprays it on metal.

CONCRETE STAVE-TYPE SILO is used for coal storage in yards of Ohio Rubber Co., Willoughby, Ohio. One of three designed, made and erected for company by Neff & Fay, of Camden, silo has poured, monolithic cover and conveyor house over all. It has 700-ton capacity and is 65 ft. high and 26 ft. in diameter.

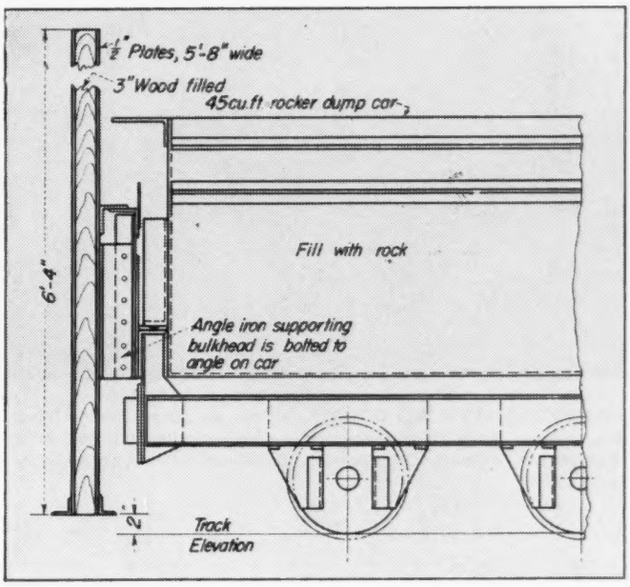
DEEP SEA ANCHOR CHAIN is rust-proofed by spraying with air brush at U. S. Steel's Federal shipyard, Kearny, N. J. Formerly four workers required three days to paint chain which now can be sprayed in single day by two men.
Wide World Photo

CONCRETE ALONGSIDE FORMS and transverse joints is compacted by Baily portable flexible-shaft type internal concrete vibrator. Portable gasoline engine drives flexible shaft which imparts to vibrating head oscillating motion at rate of 6,000 to 9,000 vibrations per min.



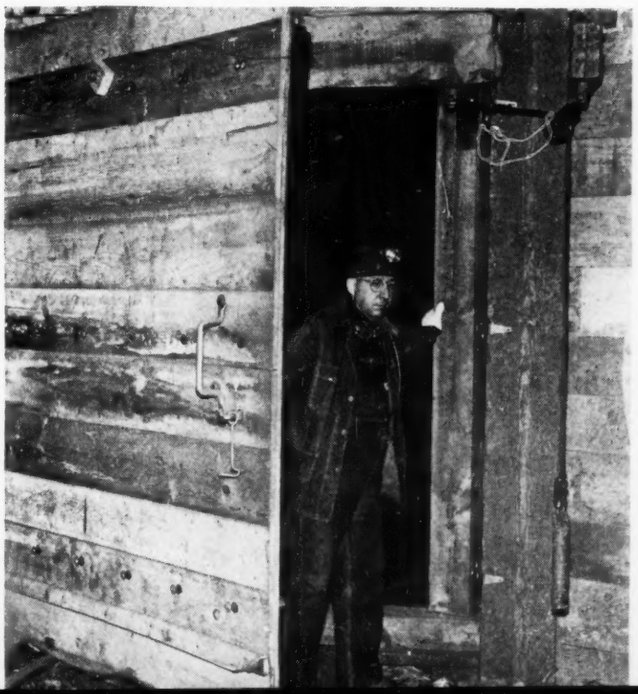
STATION NUMBER is imprinted in fresh concrete (two photos above) at beginning of day's run by Illinois Division of Highways as aid in making permanent field records.

PORTABLE BLASTING BULKHEAD prevents muck from flying from headings at Lake Shore Mine, Kirkland Lake, Ont. Bulkhead consists of two ½-in. plates with 3-in. wood filler mounted on front end of standard 45-cu. ft. rocker dump car by means of two angles which fit against legs of two angles on car frame. Bulkhead is 6 ft. 4 in. high and 5 ft. 8 in. wide.—Sketch by George Purdie, mechanical superintendent.


½" Plates, 5'-8" wide
3" Wood filled
45 cu. ft. rocker dump car
Fill with rock
6'-4"
Angle iron supporting bulkhead is bolted to angle on car
Track Elevation

SAFETY DOOR, devised by GEORGE H. DEFOND, safety engineer, Colorado Fuel & Iron Corp., is used in Sunrise Mine at Sunrise, Wyo., to avoid possible injury and damage to equipment. It consists of standard door built to swing both ways. Jamb is 6x6-in. timber hinged at back with counterweight to hold it in position. If locomotive is driven into door, jamb yields and allows door to swing into tunnel at rear.

Thos J. Barbre Photo



FORK LIFT ATTACHMENT is used to unload 42-in. cast iron pipe weighing more than 7,000 lb. per 16-ft. length for Halawa water project in Honolulu, T. H.

"Pipe Progress" Photo

Ohio Improves Old Pavements by Widening and Resurfacing with

Bituminous Concrete

By C. R. HANES

Field Engineer, Bureau of Construction,
State Department of Highways, Columbus, Ohio

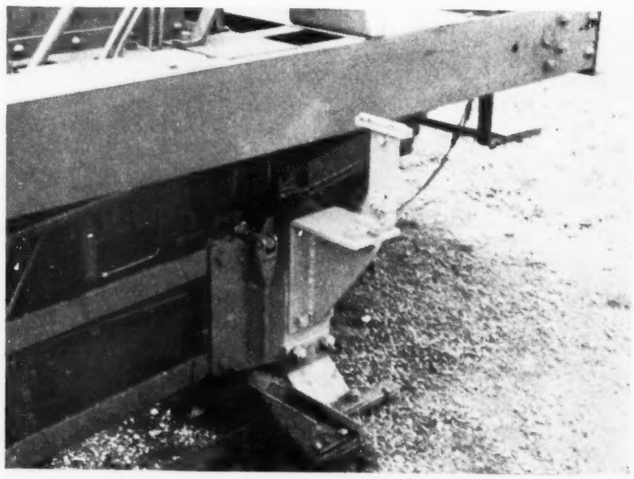
IN TWO PARTS...Part 2

PRELIMINARY LEVELING COURSE, placed to correct major irregularities in existing pavement, permits more uniform compaction and results in better riding surface than is possible when placing extreme differences in thickness in leveling material in single operation.

OHIO'S RESURFACING EXPERIENCE covers all types of old pavement and some of the practices vary with the different types. In our first experience with bituminous resurfacing, we used a 2-in. average thickness over the old pavement. Experience showed that when this thickness was used, particularly over old concrete where joints and cracks predominated, these would soon be carried through the resurfacing mat. We have accordingly increased our thickness of resurfacing generally to a minimum of 2½ in. with 1¼ in. each for the leveling and top when laying the coarser graded top. When laying the Type B finer graded top mixture we have specified some with 1-in. top thickness of material after all leveling up has been done with the coarser graded type.

Each project is carefully analyzed as to the requirements for leveling material. In addition to the minimum top which is made up of a top course and more or less regular thickness leveling course, we usually designated extra leveling material at the ratio of so many cubic yards per mile if the requirements are more or less uniform throughout the project. Some projects have apparent weakness in certain areas while others are not so bad comparatively speaking and for these sections a heavy mat is designated. In other instances areas of pavement failure may be designated for removal along with 12 to 18 in. of

EXTRA LEVELING MATERIAL is placed in separate operation due to crown irregularities. Use of regular leveling mix results in some crushing of aggregate for thinner portion of course. Cores taken after full thickness of surfacing is in place show that courses are well bonded.



LEVELING DEVICE developed for use on paver may be adjusted for desired crown.

ATTACHMENT of leveling device to Adnun paver permits operator to observe crown.

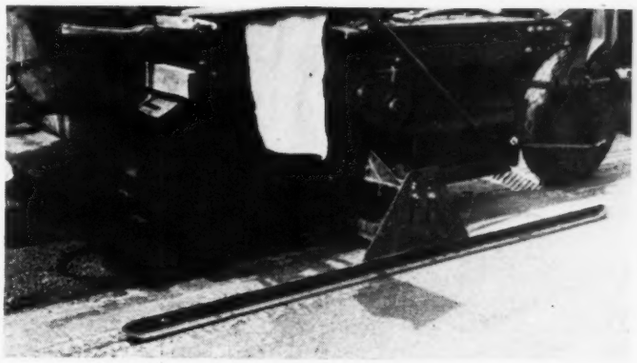
SCORING OLD SURFACING MATERIAL with ring attached to trench roller unit aids in removing old bituminous surfacing prior to placing new materials.

subgrade material and a blanket course placed with proper drainage. Ordinarily the same base is specified in these areas as is used for base widening as noted above. We use a bituminous prime coat of .10 gal. per sq. yd. for portland cement concrete, monolithic or grout filled brick and some of the old brick pavements which have open joints. Occasionally an old bituminous surface may also be primed if it is badly cracked or dried out.

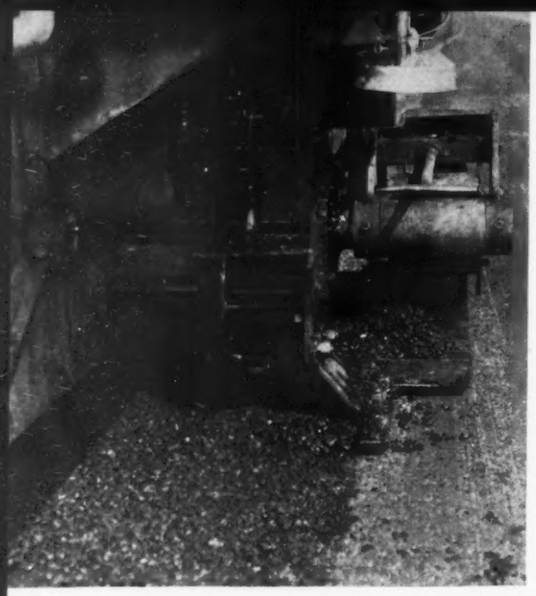
Bituminous Leveling Courses

When extra thickness bituminous mats are specified for certain areas this material is laid as a separate operation in advance of any other bituminous material in this area. Occasionally when sufficient extra level material is provided it is laid in a separate operation throughout the project with the regular paver. Separation of the leveling material and laying in two courses provides more smoothing up action with the paver and thus ultimately a better riding pavement. Separation of the leveling material and laying in two courses is advantageous on old pavements which are extremely rough or where crown correction is to be made. It permits more uniform compaction in those low areas where extra depth material would be placed with a regular leveling operation. The paver should be equipped with an indicating level attached to the screed assembly which will permit more accurate crown control where the old pavement is irregular.

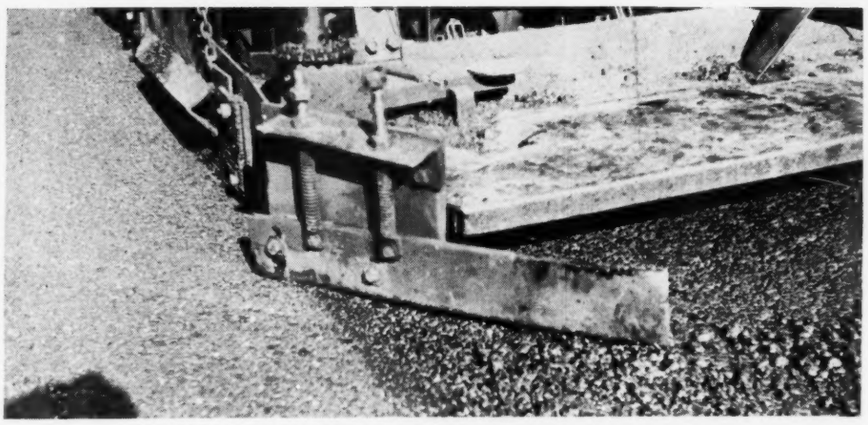
Where the extra leveling material is specifically desired in a sep-



STRAIGHTEDGE SHOE (right) is attached to Adnun paver (below) to help control grade of material. This is particularly advantageous when laying bituminous concrete adjoining previously placed lane where straightedge is operated on that material to assure placing in proper relation.



DOLLY constructed for use with Adnun paver by Ohio Engineering Co., of Lorain, aids in depositing proper depth material to make good joint.



AUTOMATIC RAKING DEVICE attached to Barber-Greene paver pulls excess coarse aggregate away from longitudinal joint. Raker arm is held in contact with previously compacted arrangement by spring attachment. Unit was developed by McCourt Construction Co., of Akron, and has been used by other contractors to help secure good longitudinal joint.

GRANULAR MATERIAL is placed on shoulders with adjustable spreader box which carries material to end by gravity with some help by workmen.

arate operation, which is particularly true of municipal sections, we have provided the finer graded Type B material for that purpose. This permits feathering out and results in a bituminous concrete with the maximum density in immediate contact with the old pavement where it is especially desirable. Some sand asphalt mixtures have been used as a preliminary leveling course. In the use of separate finer graded courses, it is the theory that it will not be objectionable if a plane of weakness is found between that course and the regular leveling course which follows, as it will then prevent transmission of the cracking from the old pavement through to the new surfacing. It is in effect doing a maintenance operation immediately in advance of the resurfacing to follow. The placing of preliminary leveling courses permits a more uniform thickness and thus a more uniform density and texture for the surface course. One feature to be guarded against in the separation of the placing of leveling material is that a sufficient thickness should be placed in the initial operation to guard against the breakage in the pavement below being transmitted up through the successive courses. This is particularly true where rigid pavement has been moving and pumping. We require that the maximum depth of leveling or base course placed in any one operation shall not exceed 3 in. when compacted.

Our maintenance operations normally require that the slabs be stabilized by pumping asphalt under them immediately before the resurfacing is to start. A variety of materials has been used in arriving at the most satisfactory method for accomplishing this work. We have found that a 50-60 penetration

WIDENING BOX (below) is adapted for spreading granular shoulder material alongside pavement.

MOTOR-DRIVEN ENDLESS BELT (below) carries granular material to edge of pavement for spreading on shoulder.

FULL-WIDTH RESURFACING is placed with Jaeger DX spreader operated from forms. This type of construction requires closing two-lane pavement to traffic.

asphalt proves most satisfactory for this work. In sealing off the void under the slab in this manner it is important that a positive seal be effected to guard against the asphalt being forced out again under traffic action. The increased thickness of bituminous concrete resurfacing over rigid pavements reduces the cracking which is carried up through the new surfacing. There is a natural tendency for the cracking to show up more predominantly when the resurfacing is done with the slabs under full expansion.

Single Course Resurfacing

We have dealt primarily with practices in laying bituminous resurfacing in two or more courses. However, in some instances where the condition of the old pavement is such that it is necessary only to add material to protect the old surfacing or eliminate a slippery condition we have placed a single course resurfacing with success. This practice is not general and is confined to bituminous concrete types which have a uniform crown and do not require any leveling.

Spreading of the bituminous concrete is accomplished with the use of self-powered pavers capable of spreading to line and grade without the use of side forms.

Normally the surfacing material is placed in single-lane widths with the requirement that the longitudinal joints in the courses be offset 6 in. from the one immediately below. This practice, in addition to the obvious advantage, permits roll-

(Continued on page 164)

PAVEMENT BROKEN UP BY WARTIME TRAFFIC into ordnance plant is shown before (above) and after resurfacing (below). Project involved placing fine graded insulation material over old bituminous mat. Bituminous concrete base material was placed full width over insulation course followed by regular two-course top construction.

Swenson and Killmer Win

BUILDER OF RAILROADS AND SPECIALIST IN

OSCAR W. SWENSON, pioneer transcontinental railroad builder, and Miles I. Killmer, who is now supervising operations on the New York half of the Brooklyn-Battery tunnel, have received the 1946 Awards "for outstanding contributions to construction progress," given each year to a non-member and to a member by The Moles, New York organization of tunnel and heavy construction men. Formal presentation was made at a dinner Feb. 6, attended by more than 700 leading engineers and construction men.

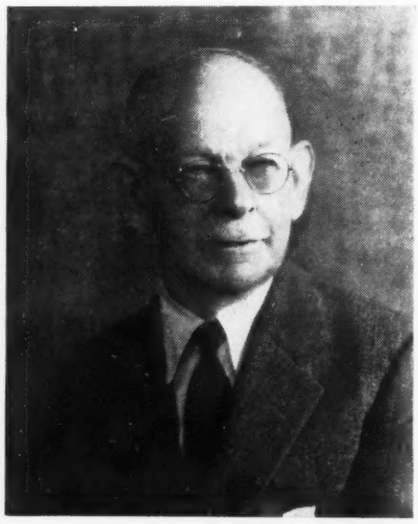
OSCAR W. SWENSON

The non-member Award crowns a long record of construction achievement for Mr. Swenson, 81-year-old president of Foley Bros., Inc., of New York, builder of 26,000 mi. of railroad. Since his younger days in the Northwest, where he saw both General Custer and Sitting Bull, Mr. Swenson has watched the construction industry progress from the use of hand labor and horses to the most highly mechanized equipment; from transportation by snowshoes to the airplane. His work, starting with the supervision of logging and milling operations in Minnesota, gradually spread to include the building of railroads in all parts of the United States and Canada, dams in California, tunnels in the East and West, railroad terminals and harbors in Nova Scotia, piers and docks in New York Harbor, drydocks in Philadelphia and Norfolk, airports in Nassau, mining operations in Montana and India, roads and docks in Persia, and countless buildings and bridges in other localities.

O. W. S., as he is known to his friends, was born in 1864 in Chicago City, Minn., 30 mi. from St. Paul, and attended country school. He then became a member of an engineering survey party engaged in the location of a railroad from St. Paul to Duluth. Later he attended Carlton College at Northfield, Minn.

For a short while he worked in the engineering and purchasing departments of the St. Paul, Minneapolis & Manitoba Railroad (now the Great Northern Railway), which was then thrusting into the Northwest.

In 1885 O. W. S. joined the organization of the four Foley brothers, Timothy, Thomas, John and M. H.,



Oscar W. Swenson

who had arrived from Canada and started in business in the '70s. He was soon in charge of their extensive logging and milling operations. When the timber limits were exhausted, he entered the construction branch of the business and progressively became manager of construction, director, secretary-treasurer and vice-president. He is now president of Foley Bros., Inc., of New York.

He began his railroad construction activities in the northwestern part of the United States, extending from St. Paul to the Pacific Coast, where he was in charge of building various portions of the Great Northern and the Kootenay Valley, Bedlington & Nelson Railroads (from Bonners Ferry, Ida., to Nelson, B. C.). After 1900 he participated in extensive operations for the Canadian Pacific, the Canadian Northern, the Grand Trunk Pacific, and the Algoma Central Railroads. This work extended from Quebec in the East through the Rocky Mountains in the West to the Pacific Coast.

Foley Bros., Inc., and their associates constructed more than 26,000 mi. of railroad and O. W. S. was in active charge of much of this work. Other operations included construction of the Connaught Tunnel through the Rockies in 1912 and the rebuilding of Halifax Harbor, Nova Scotia, in the same year.

Inspection Trips on Snowshoes

As most of this construction work was performed through territory so wild and rugged that horses or vehicles could not be used, it was necessary for O. W. S. to make exploration and inspection trips on snowshoes, involving in some cases a 600-mi. hike. As a result, his contemporaries conceded him the unofficial walking championship of Canada. Even today — at 81 — he likes his *19 holes* of golf and tires out many a younger opponent on long-distance competition. On his 72nd birthday he played 72 holes—the caddy weakened and Swenson carried his own bag the last nine.

His construction activities brought him into contact with men who were devoting their lives and energies to building the Northwest. These included James J. Hill, president of the Great Northern Railway; Sir Henry Thornton, president of the Canadian Northern Railroad; Lord Shaughnessy, president of the Canadian Pacific Railway; and Sir Harry Oakes, the great mine owner.

Mr. Swenson was chairman of the Heavy Construction and Railroad Contractors Division of the Associated General Contractors of America in 1937. In that year he was also a member of the Governing Board and the Executive Committee of the A. G. C.

Moles' Construction Awards

IN COMPRESSED AIR TUNNELING ARE HONORED

MILES I. KILLMER

Miles I. Killmer, member Award winner, is vice-president and general manager of Mason & Hanger Co., New York contractors. Over a period of 40 years, dating from the construction of the Pennsylvania Railroad's tunnels under the East River, New York, in 1906, and extending to the present-day project of completing the Brooklyn-Battery tunnel on which work, begun in 1941 and interrupted by the war, Killmer has few, if any rivals in claiming a world's record for length and variety of experience in subaqueous tunneling under compressed air.

Started as Sand Hog

Most of the important under-river tunnels for rail or vehicular transit in the metropolitan district of New York, including the several subway tubes linking Manhattan and Brooklyn, the Holland and the Lincoln tunnels under the Hudson River between the New York and New Jersey and the Brooklyn-Battery tunnel now under construction, have enlisted his abilities as a construction specialist. Except for one dam-building project and an interlude of 17 months spent as a Captain of Army Engineeers with the A. E. F. in France during the first World War, Killmer's professional career has been devoted largely to compressed air tunneling, generally rated as one of the most arduous, difficult and hazardous operations in the category of heavy construction.

A native of Pennsylvania—born at Stouchsburg, Dec. 17, 1882—and of Pennsylvania Dutch stock, he taught in a country schoolhouse for a year before entering Penn State College to study engineering. During summer vacations he played professional baseball with one of the minor leagues. After graduation in 1906, he started work at $60 a month as a chainman on the East River tunnels of the Pennsylvania Railroad and was promoted through various grades to that of inspector. In 1910 he became tunnel foreman for the contracting firms of Arthur McMullen and Snare & Triest on the building of New York's Lexington Ave. subway. Four years later, as assistant engineer with the New York Public Service Commission, he served under Division Engineer

Miles I. Killmer

Clifford M. Holland (who later directed construction of vehicular tubes under the Hudson which bear his name) on the rapid transit tunnel under the East River between lower Manhattan and Montague St., Brooklyn.

Joins Mason & Hanger

On his discharge from the Army in 1919, Killmer again worked under Holland, who had been appointed chief engineer of the joint New York and New Jersey Tunnel Commissions. As construction engineer on the 32-ft.-dia. subaqueous twin tubes, Killmer spent most of his time "down in the hole" under air pressure until the job was finished in 1926. During the course of this work he was subjected to the enormous air pressure of 48 lb. per sq. in., an ordeal only rarely experienced by deep sea divers.

On Jan. 1, 1928, he joined Mason & Hanger Co. as general superintendent and has remained with that organization ever since. For this company he has been in charge of two East River subway tubes for the New York Board of Transportation—the Fulton St. and the Rutgers - Jay St. tunnels — between Manhattan and Brooklyn. In 1934 he took charge of constructing both 32-ft.-dia. tubes of the Lincoln vehicular tunnel built under the Hudson for the Port of New York Authority. He directed field operations on the Rays Hill tunnel on the Pennsylvania Turnpike and then handled the building of Merriman Dam at Lackawack, N. Y., one of the major structures on the Delaware River Aqueduct project. This dam was about half completed in 1943 when war shortages of materials resulted in an order to suspend work.

On Brooklyn-Battery Tunnel

Now Killmer has returned to his old love—direction of sand hog operations in completing the New York half of the great Brooklyn-Battery under-river tunnel that will connect lower Manhattan with Brooklyn via Governors Island in New York Harbor. Work on this Mason & Hanger contract, stopped by the war in 1943, has recently been resumed and Killmer is again on the firing line, driving the bore eastward on its journey through the silt underlying New York Bay to the point of holing through with the tube which is pushing westward from the Brooklyn shore.

Eminently qualified for membership in the organization which this year is conferring its highest honor upon him, Killmer joined The Moles in 1938. He is also a member of the American Society of Civil Engineers.

THE FAILURE OF "FACT-FINDING"

THE PRESIDENT has asked Congress to grant him authority to appoint fact-finding boards to deal with nationally important labor disputes. Most citizens would like to see some reasonable and objective solution of the industrial strife that now is disrupting reconversion. Unfortunately, the record of the "fact-finding" procedure indicates that any claim of impartiality for this process is a gross misrepresentation.

The Administration bill would authorize the President to appoint such boards in cases certified to him by the Secretary of Labor. Each board would report to the President "its findings of fact and such recommendations concerning the dispute as the board deems appropriate." Its facilities and staff would be provided by the Secretary of Labor. The bill provides for an interval of not more than 30 days known as a waiting or "cooling off" period during which it would be "unlawful" (though no penalties are specified) for anyone to promote or encourage work stoppages.

Because the Administration did not wait for Congressional action upon its proposal, but appointed a number of fact-finding bodies to deal with current emergency cases, we have been afforded at least a partial preview of how the procedure may be expected to work out if laws establishing it are passed.

If the reports handed down by the fact-finding panels in the General Motors and oil disputes may be regarded as representative, it can be stated conclusively that Government-appointed "fact-finding" boards will concern themselves to only a minor degree with the establishing of facts. A far greater share of their effort will be concerned with the speculative business of forecasting future output and production efficiency and appraising the "ability to pay" of the companies involved. But the predominant emphasis will be placed upon framing recommendations for settling the disputes in line with announced Government wage-price policy.

In short, the procedure essentially will be one of registering with the public a government opinion as to how far wages may be raised in the cases at issue without raising price ceilings. Both the General Motors and the Oil Panels stated, in quite explicit terms, that this was their conception of the job assigned them.

"Fact-Finding" in Auto and Oil Disputes

As the General Motors Panel phrased it: "This board subscribes to, and has been guided by, the national wage-price policy" – which it summarizes as calling for wage increases to maintain take-home pay at wartime levels, to the degree possible without inflationary price rises.

The Oil Panel was even more forthright in the statement of what it was supposed to do. "In the judgment of the panel," it declared, "the earnings of the workers must be as high as is consistent with both the maintenance of the stability of the price structure and the provision for reasonable returns to the owners of industry." In other words, prices and the return to investors are to remain fixed, with labor entitled to an ever-increasing return up to the limit of what the traffic will bear.

Having thus outlined their respective conceptions of the job, each panel proceeded to carry out its mission.

The Automobile Panel recommended that General Motors increase its basic hourly wage rates by 19½ cents, which amounts to about a 17½ per cent increase on the company's average hourly wage of $1.12. The Oil Panel recommended an 18 per cent increase in basic hourly wage rates, or an additional 21 cents to the average wage rate of $1.20.

The General Motors recommendation was based almost exclusively upon the Panel's calculation that a 19½ cent raise would keep weekly take-home pay equal to that earned in 1944 when the work-week averaged 45.6 hours. The calculation turned on an estimate of what the effective work-week was likely to be in 1946.

The Oil Panel's recommendation appears to have been based on a more complex but no more conclusive accounting. After calculating that the maintenance of July 1945 take-home pay after 40-hour shifts were restored would require a 22 per cent increase in straight-time hourly wages, it recommended that an 18 per cent increase be made. It accounted for 9½ per cent of this by noting that this was needed to cover cost-of-living rises, and explained that the rest was justified by a combination of factors including loss of premium overtime pay, higher productivity, and settlements already negotiated. Since the Panel gave no indication of the weight given to these several factors, it may not be unfair to assume that the last-named was given preponderant importance, since 18 per cent was the increase already granted in collective bargaining by Sinclair and certain other oil companies.

Higher Pay Without Higher Prices

Both panels stated that the pay increases recommended could be met without raising price ceilings, but neither documents its case on this score with very conclusive "facts".

The Oil Panel confined its observations on this account to the statements that only one company in its group had pleaded "inability to pay" and that the industry was in a generally profitable position during 1943 and 1944.

The Automotive Panel stated that, under a number of assumptions about the 1946 operations of General Motors which it believed to be valid, the Company would have higher earnings than it had in 1941, its previous record year. It specifically stated that its findings in the case were not applicable outside the

automobile industry, but it recognized that the General Motors settlement would more or less determine the settlements of other automotive companies. It stated that it had not been able to arrive at a clear conviction as to the ability of other auto makers to pay similar wage advances, but it dismissed the issue by observing that they could expect to operate at full capacity in 1946, and that this should provide savings to offset the increased wage expenditures.

From the management point of view, one of the most serious limitations in the panels' procedure was their failure to deal with any of the Company claims put forward. In ordinary collective bargaining the demands of both sides are advanced and concessions in one direction are traded for concessions in the other. Here, although the companies involved had insisted upon their need for guarantees against contract violations and wild-cat strikes, and for other union concessions, nothing but the wage issue was considered by the "fact-finding" bodies. The General Motors Panel specifically recommended that the wage increase of 19½ cents be granted, but that otherwise "the status quo prevailing before the strike be restored by the reinstatement of the 1945 contract between the parties." Handled thus, fact-finding becomes indeed a wholly one-sided exercise.

Both panels accepted, quite uncritically, the general position taken by Government spokesmen that wage increases are inflationary only if they are directly translated into price advances. It should be obvious that all wage increases add to the inflationary pressure, if made at a time like the present when consumer purchasing power far outstrips the volume of goods and services available to satisfy it.

"Fact-Finding" Dodged in Steel and Rails

It is ironic, too, that even while the Automotive and Oil Panel groups were holding the "government policy" line, the President and his Reconversion and Stabilization Directors were busily at work trying to dent it. In the steel dispute, although price rises in this industry have a particularly sharp inter-industry impact, hearings by the appointed fact-finding board were deferred while negotiations were carried forward by the President and his advisors under which the industry was offered a price increase of approximately $4.00 a ton on condition that U. S. Steel and the United Steelworkers agree upon a mutually acceptable wage boost. It is hard to avoid the cynical conclusion that wage increases constitute the major administration policy, and that the principle of not translating them into increased prices is sacred only in those cases where there can be some reasonably plausible showing that wages may be raised without price advances.

Much the same general conclusion — that the "facts" are controlling only if they support a substantial wage increase — is sustained by the history of the administration of the Railway Labor Act of 1926, often cited as a glowing example of how "fact-finding" by so-called Emergency Boards of Presidential appointees has served to prevent strikes on the railroads. It is true that reports of almost all of the 31 Emergency Boards appointed to look into threatened railway strikes in the 20 years since the act was passed have provided the basis for a settlement of the disputes in question. The fact — a real fact — remains, that in 1941 and again two years later the wage adjustments found appropriate by Emergency Boards in major railway labor disputes were revised upwards at the White House after the unions involved rejected them as unsatisfactory and threatened to strike. The second upward revision was made after government seizure of the railroads to prevent a national transportation tie-up. When the "facts" did not indicate a large enough wage increase to satisfy the union and the Administration, the "facts" went out the window.

It would be irresponsible to deny the importance of finding some tenable solution of current disputes that threaten to completely disrupt the reconversion process. But upon the evidence of experience, "fact-finding" boards cannot be expected to operate according to the common conception of their function — as agencies designed to sift out for the public an objective and significant weighing of the facts behind conflicting claims.

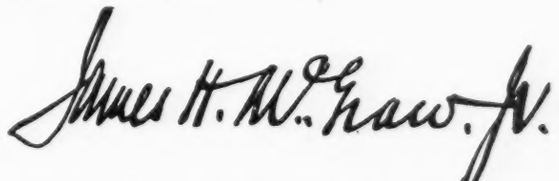
Without Principles Facts Mean Little

Facts, if they are assembled upon a sufficiently partisan basis, can be made to document almost any case one wishes to establish. The major difficulty in marshalling facts to resolve wage disputes is that there are no agreed-upon principles to determine the levels at which wages should be set. In the absence of such principles, it is inevitable that "fact-finding" boards, appointed by the Administration, manned largely by those who helped develop and administer Administration wage policies, and depending for technical assistance upon Administration Departments, will serve merely to implement Administration wage policy.

If Government means to reassert its wartime authority to fix wages — an objective specifically disavowed by the President and seemingly wanted by no one — it should accept the responsibility directly, rather than operate to that end through "fact-finding" boards which are independent in theory, but which cannot be so in fact.

The failure of the brand of "fact-finding" now urged upon Congress by the President is evident. Therefore, we must look for a solution along other lines.

What is needed is for labor and management to agree upon the principles that should govern the determination of wages under free collective bargaining. When such agreement is reached, then and only then, can fact-finding become an objective and useful instrument for settling wage disputes.



President, McGraw-Hill Publishing Co., Inc.

THIS IS THE 44TH OF A SERIES

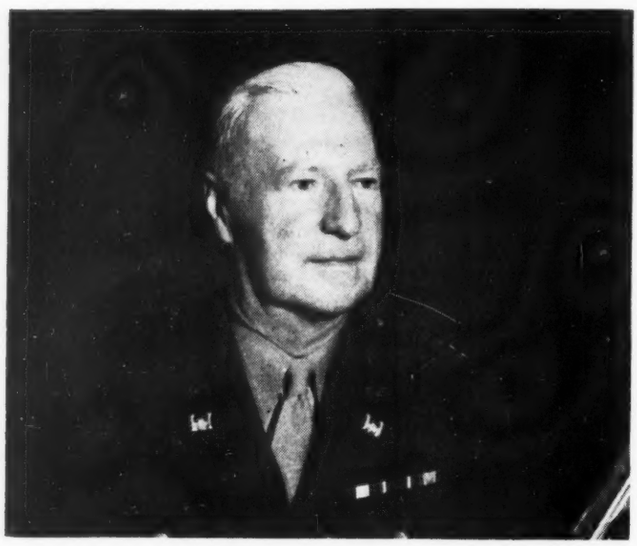
Present and Accounted For...A PAGE OF PERSONALITIES

AS MANAGER OF AIRPORT DIVISION of American Road Builders Association WALTER R. MACATEE will cooperate with aviation groups in solving airport engineering problems. Mr. Macatee was special Washington representative for Asphalt Institute.

NEW DIRECTOR OF HIGHWAYS for state of Washington, CLARENCE B. SHAIN fills vacancy left by death of Clarence Hickey. Mr. Shain was formerly director of hydraulics in state's Department of Conservation and Development.

NAMED CHAIRMAN of New York City Board of Transportation on his release from active army service, MAJ. GEN. CHARLES P. GROSS succeeds John H. Delaney, chairman since 1924. Gen. Gross has headed Army Transportation Corps since 1942.

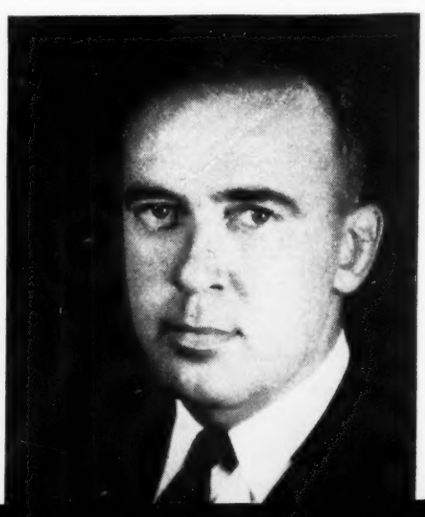
Signal Corps Photo



RETIRING CHIEF of Construction Division, Corps of Engineers, is MAJ. GEN. THOMAS M. ROBINS, who has served with Engineers since 1904. He was named Deputy Chief of Engineers in 1943. Gen. Robins was awarded Distinguished Service Medal for his work in charge of Engineer Depot at Hoboken, N. J., Port of Embarkation.

Signal Corps Photo

APPOINTED U.S. COMMISSIONER of Reclamation, MICHAEL W. STRAUS, former Assistant Secretary of the Interior, will direct extensive post-war reclamation and natural resource development program. He succeeds Harry W. Bashore, who retired after 39 yr. of service with bureau.



← →

NEW PRESIDENT of American Society of Civil Engineers, WESLEY W. HORNER (left), consulting civil engineer of St. Louis, Mo., took office at Society's annual meeting Jan. 16-18. He was for 15 yr. chief engineer of sewers and paving for St. Louis. JAMES E. JAGGER (right) has been named assistant secretary of Am. Soc. C.E. He was acting assistant secretary for more than 3 yr.

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Precisionbilt and Pre-formed for long, profitable service • J&L builds wire rope as a fine piece of machinery—builds it as a precision product like a fine stop-watch.

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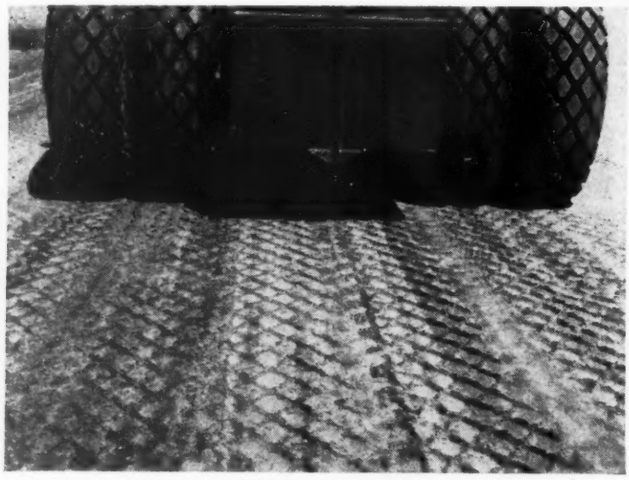
PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

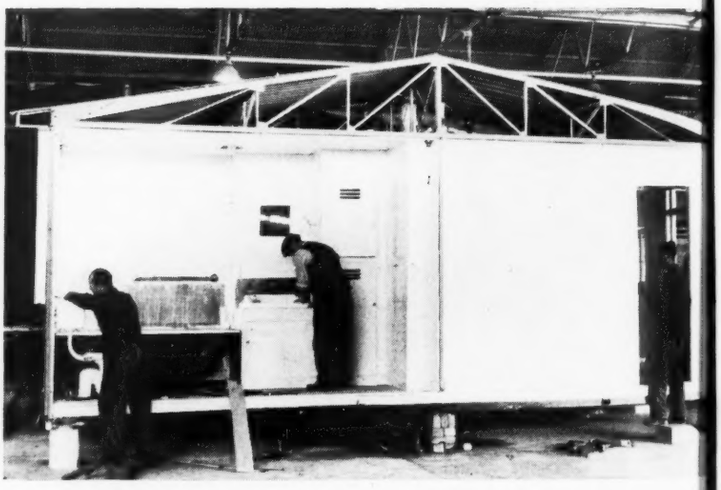
J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

JOB oddities

BROOKLYN BRIDGE IS "SOLD" at auction by EX-MAYOR F. H. La GUARDIA of New York (center) to JACOB W. SCHWAB (right), president of United Merchants Manufacturing Co., Inc., for $17,500,000 worth of war bonds. Wooden scale model of bridge is presented to its purchaser by WILLIAM E. COTTER (left), chairman, Greater New York Finance Committee. Auction was held at Manhattan end of bridge at December "re-unveiling".
Press Association Photo

FOOTPRINT OF 175-TON "GISMO" (below), job-named behemoth, leaves definite pattern of tire treads on subgrade at Fairfield-Suisun airbase in California, where U. S. Army Engineers use huge vehicle on three dual wheels, loaded with steel ingots, to detect soft spots and complete compaction before paving is placed under joint contract of Morrison-Knudsen Co., Inc., and Stolte, Inc.
Army Engineer Photo

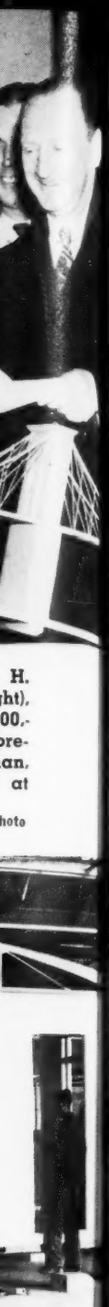




ALUMINUM ALLOY HOUSES are constructed by England's Bristol Aeroplane Co. to ease housing shortage and provide employment. This prefabricated structure is built in four separate units, each measuring approximately 22 ft. 8 in. by 7 ft. 4½ in.
British Combine Photo

PANNING FOR GOLD (below) at site of reservoir behind Anderson Ranch Dam, now under construction in Idaho, is unusual activity of U. S. Bureau of Reclamation. Object is to assay mineral samples and thus obtain evidence to contest possible legal action by holders of placer claims which will be flooded by reservoir.

TRAILER-LAUNCHED, 80-FT. SCISSORS BRIDGE (below) can be installed by 6 men in 3 min. to carry equipment weighing up to 35 tons. Tested and perfected by Heil Co., Milwaukee, in cooperation with U. S. Army Engineer Board, bridge is 13-ton aluminum plate-girder assembly hinged in center to fold in half.



7 CONCRETE FACTS

About Air-Entraining Cement

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1. **Complies with** ASTM specifications and sells at same price as regular cement.
2. **Requires** less mixing water for a given slump.
3. **Makes concrete** more workable, more uniform, and more durable throughout.
4. **Minimizes** segregation and bleeding.
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7. **Renders** paving concrete highly resistant to scaling due to action of de-icing salts.

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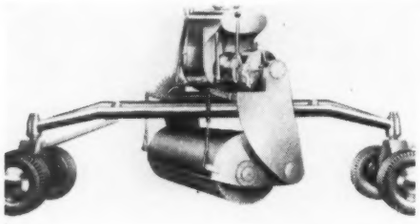
SUNDAY EVENINGS—*American Broadcasting Company (Blue) Network—U. S. Steel's "The Theatre Guild on the Air"*

CONSTRUCTION EQUIPMENT NEWS

FEBRUARY 1946 REVIEW
of Construction Machinery and Materials

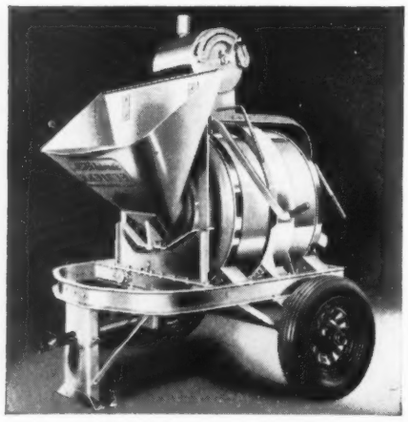
TWO-WAY POWER BROOM has all-welded, one-piece tubular frame to reduce weight and provide maximum in structural strength. Power drive assures uniformly clean sweeping of any surface regardless of traction speed. Dual self-locking tongue permits towing broom in either direction. Suspended on roller mounted turntable, it can be quickly



adjusted to any angle. Retainer spring holds broom to surface over uneven pavement. All-steel case, perfectly aligned and balanced, eliminates skipping and permits faster revolutions per minute. Spring balance provides finger-tip control. Broom is 8 ft. long and 28 in. in diameter. Wheel base is 14 ft.—**Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 11, Calif.**

★ ★ ★

IMPROVED MODEL CONCRETE MIXER has measuring hopper, which automatically shakes its charge into drum when gate is opened. Hopper, with low front and high back, has same capacity as mixer drum. It



is loaded while previous batch is being mixed and discharged. Pull of lever which opens hopper gate automatically starts power vibration which shoots load into and across drum in swift slide without need for pulling hopper front. Action of 3½ S autoloading mixer is identical with that used on 1- and 2-cu. yd. mixers and is said to increase average daily yardage of machine by 15 to 20 more batches. Drum tracks of machined high carbon steel and interchangeable steel or pneumatic tired wheels are standard features.—**The Jaeger Machine Co., Columbus 16, Ohio.**

★ ★ ★

FLEXIBLE TUBING, non-collapsible under plus or minus pressure and retractable to about one-eighth its extended length, is now available for portable or semi-permanent ventilation or any handling of air, gases or light solids. Its spring steel helix core causes it to

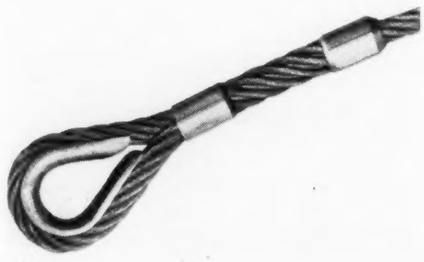
spring out to its fully extended length and it will stay in this position whether working on pressure or suction. Feature is method of spiral-stitching spring core within fabric. Inside surface is free of wire ridges, providing far less resistance to air flow and no obstruction to passage of solids. Sharp bends can be made with only slight reduction of air flow and without use of elbows or special fittings. Made of long-fiber duck, having bursting strength of 170 psi, it is processed fire-resistant and covered with tough, durable thermoplastic. No exposed metal inside or out eliminating possibility of sparking. Used for removing dust and excess product in grinding operations, sawdust and wood chips in woodworking, welding fumes, and in mining other than coal. Furnished in standard diameters from 3 to 16 in. and in lengths of 10, 15 and 25 ft. Built-in couplings permit quick joining or disconnecting.—**The Warner Brothers Co., Spiratube Division, Bridgeport, Conn.**

POWER BRUSH for removing scale, slag and weld splatter prior to painting was of great use in constructing temporary bridges over European waterways during war. One large builder used an extra heavy disk center wire cut brush of 6 in. dia. of .035 S.A. wire ex-

tending 1¾ in. outside cup to clean welds and remove slag preparatory to assembly of steel pipes 2½ ft. long by 4 in. in dia. to 8x8-in. steel plates, which are welded together. Power brushing operation was completed by attaching brush to flexible shaft and operating it at speed of 2,700 rpm. User reports completion of 50 of these parts with one brush.—**The Osborn Manufacturing Co., 5401 Hamilton Ave., Cleveland, Ohio.**

★ ★ ★

NEW METHOD FOR SPLICING WIRE ROPE into slings or various assemblies makes hand-tuck splicing unnecessary. Acco-Loc safety splice is flexible clear to terminal and always develops 100 percent of rope's



strength. Does not distort rope structure and thus maintains equalization of stresses in all strands. It applies load stress in direct line with pull of load. Has no seizings to loosen, unravel or get in way, no wire ends to barb, and is wide open for visual inspection at all times. Splice may be used with any standard fitting—hook, ring, shackle or thimble.—**American Chain & Cable Co., Inc., of Bridgeport, Conn.**

Speaking of POSITIONS

ADAMS Gives You ALL These with Blade Centered on Circle

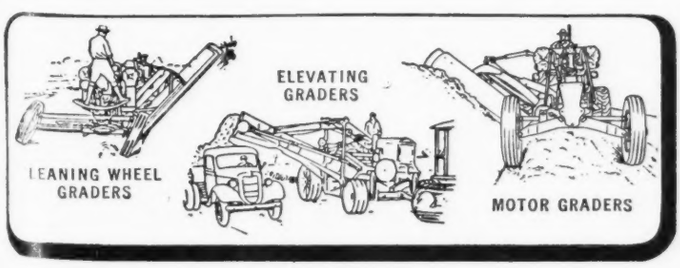
AN EXTREMELY wide range of blade positions—*obtained without mechanical adjustments*—is one of the important operating advantages which has made Adams Motor Graders top favorites the world over.

Quickly, easily, Adams fast power-operated blade controls—conveniently located at operator's finger tips—accurately position the blade for virtually all surface, ditch and bank work . . . *without shifting blade on circle or even adjusting blade lift links!*

Occasional cuts, which call for unusual blade positions, are easily handled through simple adjustment of telescopic lift links. Only where extreme blade positions are demanded is it ever necessary to shift blade on the circle.

Discover how this, and other Adams' superiorities, will speed operations, increase efficiency and reduce costs . . . for you! For complete information visit or phone your near-by Adams dealer.

J. D. ADAMS MANUFACTURING CO., Indianapolis, Indiana

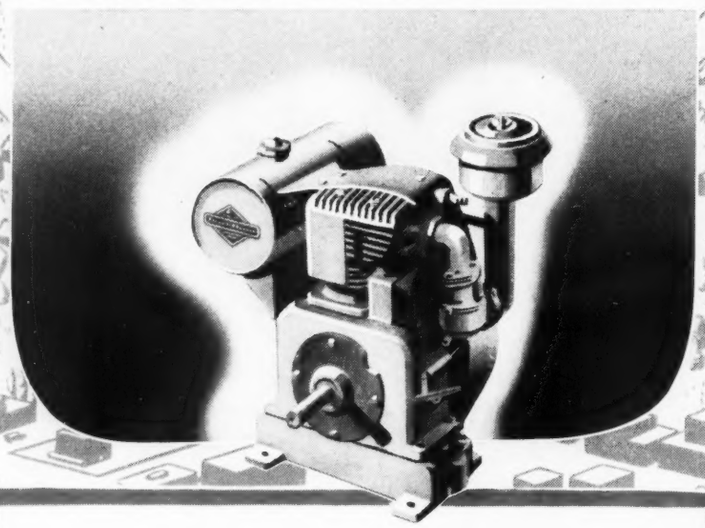


Adams

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

BRIGGS & STRATTON ENGINES

THE "RIGHT" POWER FOR YOUR EQUIPMENT

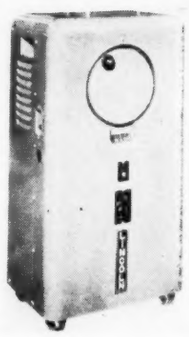


Manufacturers, dealers and users of gasoline powered appliances, farm machinery and industrial equipment know from experience that it pays to power with Briggs & Stratton 4-cycle, air-cooled engines. Over two and one quarter million of these engines have demonstrated their ability to deliver dependable power under all operating conditions. Specify Briggs & Stratton engines and you are assured of the "right power" for your equipment.

BRIGGS & STRATTON CORPORATION
MILWAUKEE 1, WISCONSIN, U.S.A.

Air-Cooled Power

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES



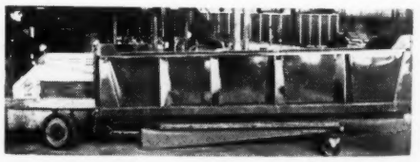
PORTABLE WELDER for shop use called "Fleet-Arc Jr.," is for 235-v. single-phase power lines, meets limited input requirements of rural utilities, has maximum input current of 35 amp. and can be used with standard 3-kva. power transformer. Current range is from 20 amp. at 20 v. to 100 amp. at 25-v. welding duty, providing sufficient capacity for all types of job found in most job-welding shops. Handles electrodes ranging from 1/16 to 5/32-in. dia. Unit inaugurates revolutionary development known as "Arc Booster" which provides quick easy arc starting. Instant electrode touches work, welding current is given boost of intensity for starting arc, reverting automatically to amount set for job. Features: (1) Wear-free and vibrationless reactor current control with self-cleaning chain drive; no taps or plugs to develop loose connections; (2) heavy copper winding with spun glass insulation and mica coil separators. Arc-welded steel frame and housing.. Weight 360 lb.—**Lincoln Electric Co., Cleveland 1, Ohio.**

★ ★ ★

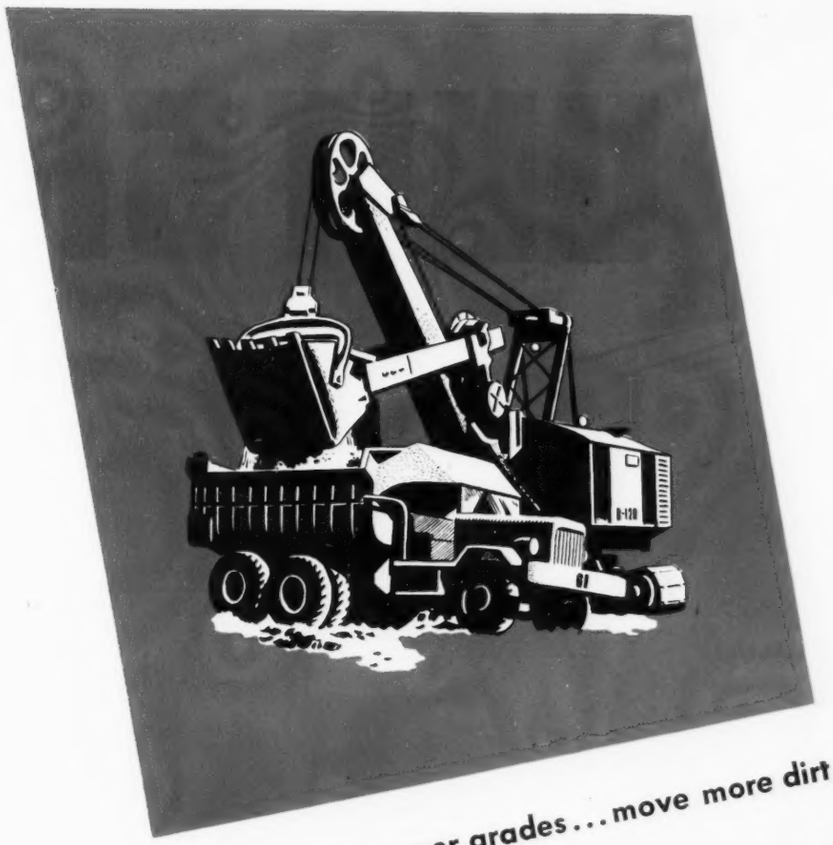
ARC-WELDING COMPOUND, known as "Strike Easy" and designed to aid in instantaneous creating and maintaining of a metallic welding arc where low currents and small diameter electrodes are employed, is easily applied and can be used on any kind of metal with any type of electrode. Compound, which is in paste form, is available in 1-lb. glass jars ready for use. No mixing or other preparation is required.—**General Electric Co., Schenectady, N. Y.**

★ ★ ★

ELONGATED TWO-WHEEL DOLLY, for use with low-lift platform trucks, is particularly useful in transporting long and heavy objects such as dump truck body shown in accompanying illustration. Truck body, which is fabricated by welding steel plates,



is approximately 15 ft. long, 3 ft. high and 6 ft. wide. It is lifted on to dolly by overhead crane. Dolly is made from steel plate with sides shaped and turned down. Forward end is mounted on wheels and rear end rests on floor. Upper surface is practically at uniform level making it easy for truck's platform to be pushed underneath. By lifting rear end of dolly off floor, entire load is supported on wheels, four on industrial truck and two on dolly. In this position, this and similar loads may be moved anywhere.—**The Elwell-Parker Electric Co., Cleveland, Ohio.**



You can pull steeper grades . . . move more dirt

or handle more tonnage . . . in less time . . . at

lower cost—with a Cummins Dependable Diesel!

PROOF! No fewer than 54 active, major manufacturers of earth moving and material handling equipment today offer Cummins Diesels as standard or optional original power. Here's ample proof of profitable power . . . the reason why any list of the nation's leading contractors is a list of Cummins owners! Why not get the full facts on the unfailing economy, reliability and low weight per horsepower of Cummins Dependable Diesels? 150-200-275 hp. Ask your dealer, or write Cummins direct.

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

UNIT 514

So Easy to Handle

CRANE

CLAMSHELL

DRAGLINE

TRENCHOE

MAGNET

Convertible **TO ALL ATTACHMENTS**

Full-Vision Cab ... ENABLES OPERATOR TO SEE IN ALL DIRECTIONS

Here's a sturdy, nimble ½-yard excavator with compact, streamlined design . . . built for safe, efficient operation. Fast, finger-tip responsiveness. All controls within easy reach of operator. Automatic, foolproof traction brakes. New full vision cab, equipped with shatter-proof glass, promotes safety and increases operating efficiency.

CONTACT FACTORY DIRECT
FOR PRICE AND DELIVERY

½ AND ¾ YD. EXCAVATORS — 5 TO 10 TON CRANES

UNIT CRANE & SHOVEL CORP. — UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN — **MILWAUKEE 14, WISCONSIN, U.S.A.**

A4873-1PC-R

Here's the FIRST-NEW-POSTWAR PORTABLE AIR COMPRESSOR

. . . a Sullivan of course!

BIG!

in available power
in air delivered
in bearing areas
in air storage capacity
in fuel storage capacity
in cooling capacity
in dependability

SMALL!

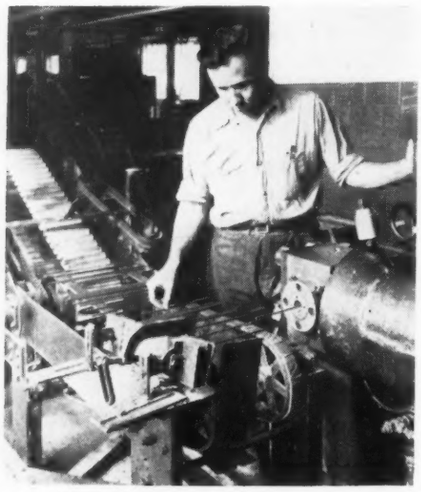
in length
in width
in height
in weight

Sullivan presents this modern, streamlined, sturdy and most efficient line of portable air compressors, the *NEW* WK-80 SERIES. It's the first portable air compressor to incorporate the NEW materials and efficiency-producing mechanical improvements developed during the war. You have never seen so much air-power, efficiency, portability, low maintenance and reliability packed so efficiently in so little space. With Sullivan patented, direct-concentric valves, two-stage compression, streamlined air passages and the "ECONO-MISER" load control that regulates air supply to demand, the WK-80 sets new high standards of compressor efficiency. Its sturdy "Bulkhead" body construction, full force-feed lubrication, "Cascade" oil cooling and low piston speeds . . . assure lowest maintenance. Add to all these features its minimum over-all dimensions and you have a portable compressor that's as modern as this minute — one that will give you real pride of ownership. The new Sullivan WK-80 is offered in many different sizes, types and mountings. Get all the facts from your nearest Sullivan distributor or branch office. Ask for bulletin A-55, **Sullivan Machinery Company, Michigan City, Indiana and Dundas, Ontario.**

RUGGED, COMPACT
REALLY PORTABLE!

SULLIVAN

WELDING ELECTRODES, named Ni-Rod, for making machinable welds in cast iron and said to mark distinct step forward in art of welding this metal, is now available, together with an 80-20 nickel, chromium, electrode for welding Inconel side of Inconel clad steel. Also six other electrodes for welding Monel, Inconel, nickel, "L" nickel, "K" Monel, 70-30 cupro-nickel and various clad steels. Production follows same pattern for all types of electrodes and is carried



out in automatic equipment, beginning with mixing of flux, following through slug press, loading into magazine of flux extrusion press and passage through new 90-ft. multiple-pass conveyor oven. Each electrode passes through oven, back and forth, five times, starting from top and discharging at lowest level end. Maximum capacity of the plant is more than 1,000 lb. of electrodes per hr.—**International Nickel Co., Inc., 67 Wall St., New York, N. Y.**

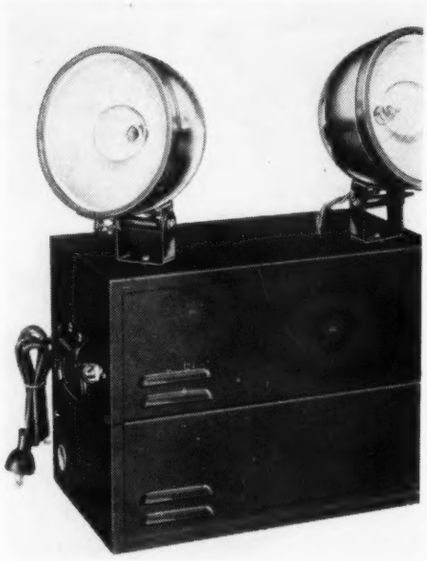
★ ★ ★

SOLDERING IRONS ranging from 75 to 300 watts in size and available with tips from $\frac{3}{8}$ to $1\frac{1}{4}$ in. in dia., are designed primarily for severe and exacting soldering operations in industrial plants where fast, continuous, high quality soldering is required. Also suitable for light, medium and heavy intermittent soldering. Features: (1) Quick recovery and high reserve heat capacity permit soldering as fast and continuously as character of work allows; (2) use in these irons of calorized (surface-alloyed with

aluminum) copper and 18-8 stainless steel for all parts subjected to high temperatures; (3) heating units easily replaced; (4) chisel-shaped copper tips calorized, retarding corrosion, and facilitating easy renewal and preventing tip threads from "freezing" to tip holders. Irons are furnished with copper tips, working ends of which are surfaced with iron which will not amalgamate with tin in solder as copper does. Hence, pitting and erosion of tips are obviated, making filing unnecessary. Plastic handles, cool and easy to grip, are provided, reducing operator fatigue and contributing to consistent production.—**General Electric Co., Schenectady, N. Y.**

★ ★ ★

PORTABLE EMERGENCY LIGHTING UNIT, "Minuteman light warden," provides instant, automatic emergency lighting protection, enabling management to stop machinery, operate switches, valves and controls, prevent theft and sabotage, make repairs, avoid injuries and evacuate premises without panic. May be installed on post, bracket, shelf or platform. No special wiring required. Each lamp head capable of illuminating more than 10,000 sq. ft. for approximately



4 hr. When normal current is resumed, Minuteman lamps automatically go out and built-in charger restores power to long life batteries for next emergency. Lamp is self-contained and portable and may be carried from its regular station for rescue and other emergency work. Can also be equipped with a built-in transformer to permit everyday use on regular current supply without draining battery power.—**Electric Cord Co., 30 Church St., New York 7, N. Y.**

★ ★ ★

ELEVATING LADDER TOWER is raised and extended by single hand-operated winch, self-locking at any extended height. It has 360-deg. turning radius for manual or automatic operation and variable inclination from 45 to 75 deg. Made in three strongly trussed sections locked in place by continuous steel guides operating on sleeve-type bronze roller bearings, it opens to 35 ft. 2 in. maximum working height when at 75-deg. angle, with minimum working height of 22

ft. 8 in. when at 45-deg. angle. Fully extended height of unit itself is 38 ft. To provide maximum rigidity when elevated, there is 5-ft. 10-in. lap of middle section over lower. Top section has 4-ft. 8-in. overlap on center section. Folding 24x30-in. work platform at top has adjustable tubular guard rail. Trap door permits easy access to platform. When folded down in horizontal position, tower is 17 ft. 1 in. long and 6 ft. 3 in. high.—**Universal Fittings & Scaffolding Co., Zelienople, Pa.**

★ ★ ★

FULL VISION RESPIRATOR HOODS are designed to give complete head protection on jobs and operations involving dust and spray and at the same time to permit normal, unrestricted vision. Equipped with 5x9-in. full-vision-type plastic windows, easily and

quickly replaced when necessary without use of tools. Made of close woven cotton cloth extending down to shoulders and provided with drawstring for pulling in at neck, if desired. May be worn with or without correction glasses—**Industrial Products Co., 2820 N. Fourth St., Philadelphia, Pa.**

Train Apprentices Right with faster-working SKILSAW

... the way they do in Cleveland, Ohio

Veterans Learn Building Trade and Help Build
By WILLIAM BEBOUT
This is a story about some returned war veterans who are learning the business of building homes to house some of the veterans who have not yet come home.
It's a story of the building trades and what this trade is doing to re-establish the returned war heroes.
The four

Photographs from the Cleveland PRESS

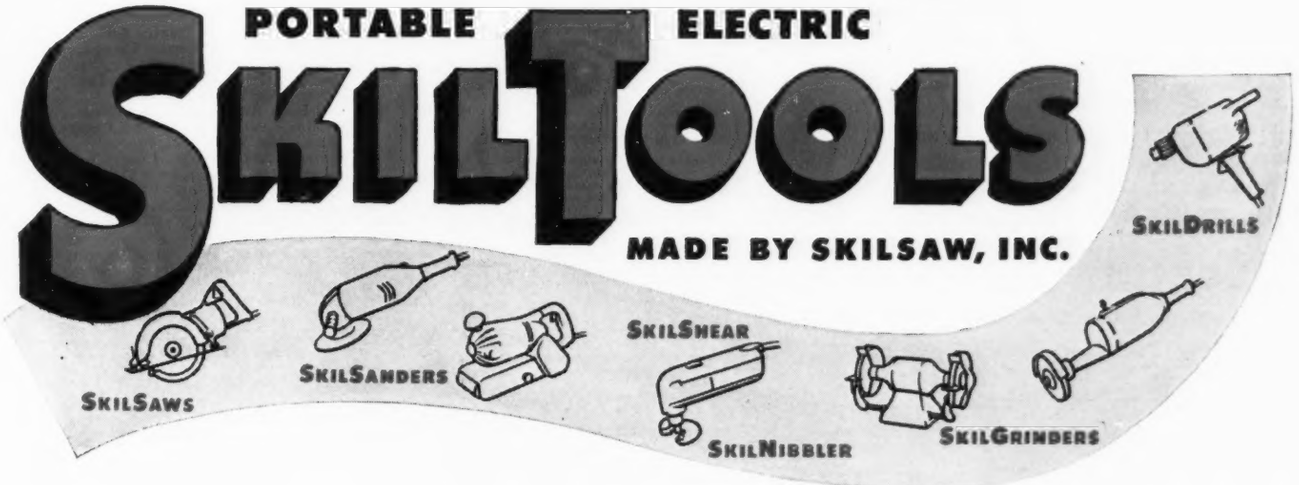
● Apprentices learn modern building methods quicker . . . become productive for you at once when you train them with SKILSAW right from the start. One apprentice with a SKILSAW can keep 6 veteran carpenters busy laying-in and nailing. Ask your distributor to show you the many ways to save time and money with SKILSAW on every cut in construction work.

SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in all Principal Cities

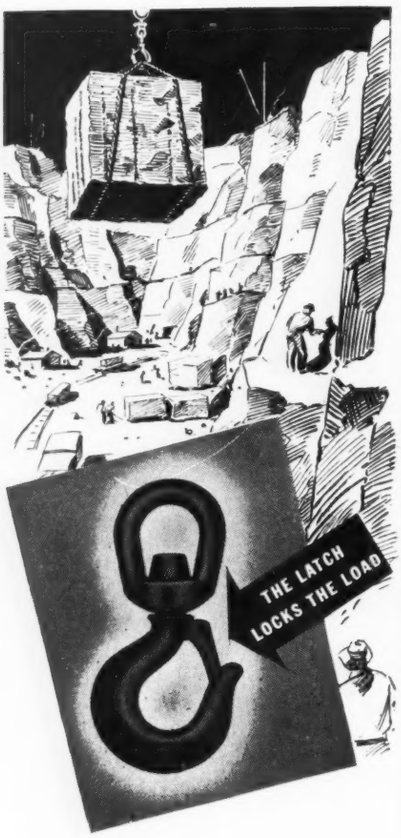
PORTABLE ELECTRIC

SKILTOOLS

MADE BY SKILSAW, INC.



A HOOK *that* CAN'T LOSE ITS LOAD



The newly-designed latch (with stainless steel spring) gives Laughlin's unique Safety Hook a 25%-40% wider throat opening.

Don't chance accidents up above. Laughlin's Safety Hook keeps loads under control even if jolted in mid-air.

They are made of drop-forged steel, heat-treated. They're rugged. Get the details on these hooks with the improved type of latch.

OTHER LAUGHLIN HOOKS

Laughlin offers the most complete line of hooks, including grab hooks, hoist hooks, cargo hooks and other types, all heat-treated, drop-forged and weldless.

Distributed through mill, mine and oil field supply houses. For catalog, write Dept. 1, The Thomas Laughlin Company, Portland 6, Me.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

CIRCUIT TESTER, called "Lo-Volt" Test Glo, simplifies testing of open circuits from 5 to 50 v., and burned out fuses and can be used to indicate relative values of line voltage. Incandescent "glow" lamp is protected by transparent plastic housing. Overall length, 7 in. Can be carried in pocket. Fully insulated test leads, 4 in. long. Particularly suitable for telephone repair men, automotive and aircraft mechanics and electricians.—**Ideal Commutator Dresser Co., 4102 Park Avenue, Sycamore, Ill.**

★ ★ ★

TRANSPARENT WATERPROOFING, named Ranetite No. 5, combines aluminum and calcium stearic as a base to produce a seal for every kind of stone, brick and stucco walls, keeping dampness from penetrating and destroying alkali deposits so often found on surface. This method of waterproofing is used only on virgin surfaces and must not be applied over paint or oil coatings. Will spread about 400 sq. ft. per gal. Ready for use and easily applied with brush or spray so long as all voids are thoroughly filled. Claimed to be absolutely transparent and not to show after application on outside of masonry. —**Ranetite Manufacturing Co., Inc., St. Louis, Mo.**

Shunk

Superior Quality

BLADES AND CUTTING EDGES

For any make of machine Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

50 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

Shunk Member of A.E.D.

MANUFACTURING COMPANY

Established 1854

BUCYRUS, OHIO.

Worthington-Ransome Blue Brute Distributors

See ad on page 121 for list of equipment in each line

Worthington-Ransome Distributors

Ala., Birmingham, J. D. Pittman Tractor Company
Montgomery, Burford-Toothaker Tractor Co.
Cal., San Francisco, Coast Equip. Co.
Colo., Denver, Power Equipment Company
Fla., Miami, Allied Equip., Inc.
Fla., Orlando, Highway Equip. & Supply Company
Tampa, Epperson & Company
Ga., Atlanta, Tractor & Machinery Company
Ida., Boise, Olson Manufacturing Company
Ill., Chicago, Chicato Construction Equipment Co.
Maine, Portland, Maine Truck-Tractor Company
Mass., Boston, Clark-Wilcox Co.
Mich., Muskegon, Lakeshore Machy. & Supply Co.
Minn., Minneapolis, Phillippi-Murphy Equip. Co.
Miss., Jackson, Jackson Road Equip. Co.
Mo., Clayton, The Howard Corporation.
Montana, Billings, Interstate Truck & Equip. Co
Helena, Caird Eng. Works
N. M., Albuquerque, Bud Fisher Co.
N. Y., Albany, Milton-Hale Machinery Company
New York, Hodge & Hammond, Inc.
N. D., Fargo, Smith Commercial Body Works, Inc.
Ohio, Cincinnati, Carroll Edwards Co.
Okla., Oklahoma City, Townsco Equip. Company
Oregon, Portland, Andrews Equip. Service
S. C., Columbia, Smith Equipment Company
Tenn., Knoxville, Dempster Bros., Inc.
Texas, Dallas, Shaw Equip. Co.
Utah, Salt Lake City, J. K. Wheeler
Vt., Barre, A. M. Flanders, Inc.
Wash., Spokane, Andrews Equip. Service
Wisc., Milwaukee, Drott Tractor & Equip. Co., Inc.

Ransome Distributors

Ariz , Phoenix, Lee Redman Company
Ark., Little Rock, Kern-Limerick, Inc.
D. C., Washington, M. A. Doetsch Mach. Company
Ill., Chicago, Thomas Hoist Company
Ind., Fort Wayne, American Steel Supply Co.
Ky., Paducah, Henry A. Petter Supply Company
La., New Orleans, Ole K. Olson Company
Md., Baltimore, Stuart M. Christhilf & Company
Mich., Detroit, T. G. Abrams
Mo., Kansas City, Brown-Strauss Corp.
Neb., Lincoln, Highway Equip. & Supply Co.
N. J., Newark, Johnson & Dealaman
N. C., Raleigh, Smith Equip. Company
O., Cleveland, H. B. Fuller Equip. Company
Pa., Philadelphia, Giles & Ransome
Wilkinsburg, Arrow Supply Company
Tex., El Paso, Mine and Smelter Supply Company
Houston, McCall Tractor & Equip. Company
W. Va., Charleston, Clyde P. Beckner, Inc.

Worthington Distributors

Ark., Fort Smith, R. A. Young & Son
Little Rock, R. A. Young & Son
Ind., Indianapolis, Reid-Holcomb Company
Iowa, Des Moines, Electric Eng. & Const. Co.
Ky., Harlan, Hall Equipment Sales Company
Louisville, Williams Tractor Company
La., New Orleans, Wm. F. Surgi Equip. Company
Md., Baltimore, D. C. Elphinstone, Inc.
Mass., Cambridge, Field Mach. Company
Mich., Detroit, W. H. Anderson Co., Inc.
Flint, Gransden-Hall & Company
Mo., Kansas City, Mach. & Supplies Co.
N. J., Hillside, P. A. Drobach
No. Bergen, American Air Compressor Corp.
Roswell, Smith Machinery Company
N. Y., Buffalo, Dow & Co., Inc.
New York, Air Compressor Rental & Sales
Olean, Freeborn Equip. Company
N. C., Raleigh, Carolina Tractor & Equip. Co.
O., Cleveland, Gibson - Stewart Company
Toledo, The Kilcorse Mach. Co.
Pa., Allentown, H. N. Crowder, Jr., Inc.
Easton, Sears & Bowers
Harrisburg, American Equip. Corp.
Oil City, Freeborn Equipment Company
Philadelphia, Metalweld, Inc.
Pittsburgh, Atlas Equip. Corp.
Wilkes-Barre, Ensminger & Company
Tex., El Paso, Equip. Supply Company
Houston, Dye Welding Supply Company
San Antonio, Patten Machinery Company
Va., Richmond, Highway Mach. & Supply Co.
Wash., Seattle, Star Machinery Company
W. Va., Fairmont, Interstate Engineers & Constr. Incorporated
Wyoming, Cheyenne, Wilson Equip. & Supply Co.

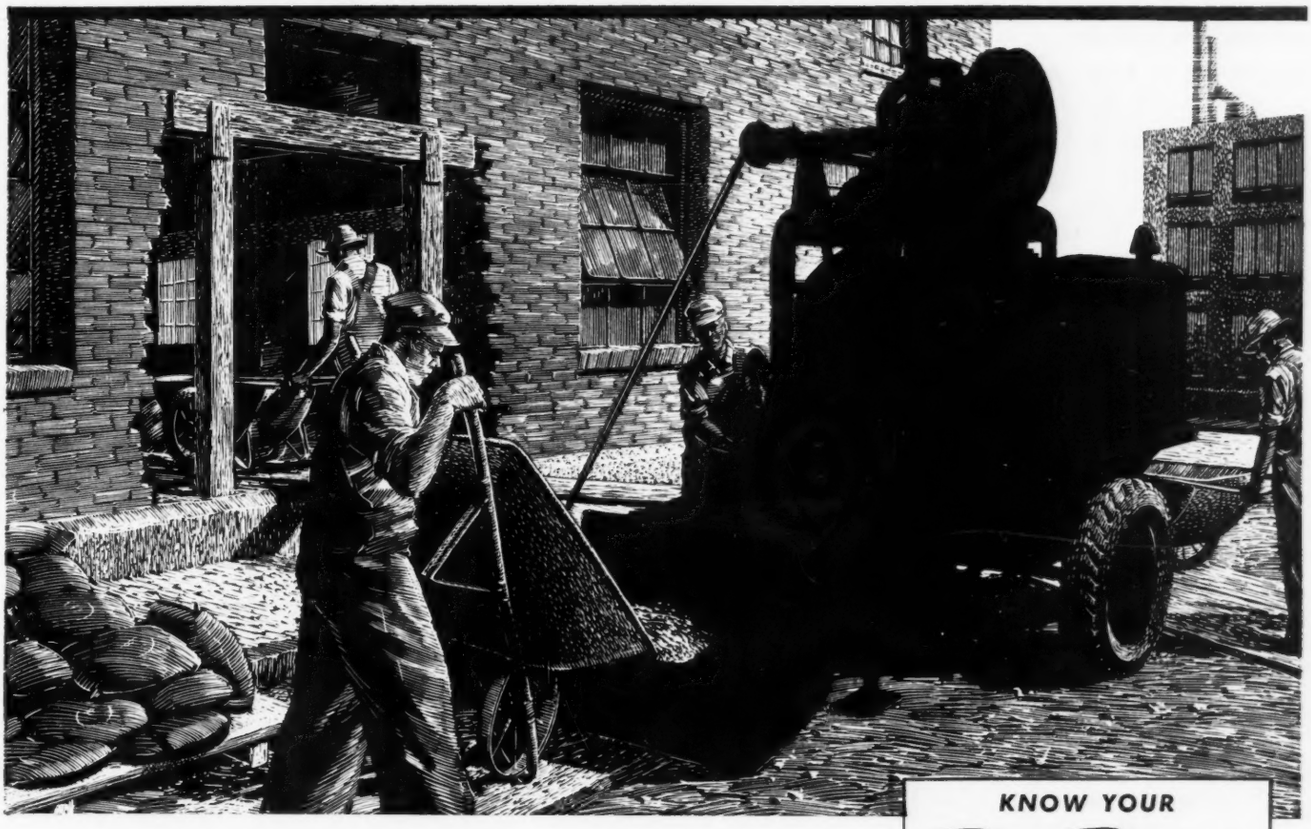
Buy Blue Brutes

Worthington Pump and Machinery Corp.

Worthington-Ransome Construction Equipment Division

Holyoke, Massachusetts

BETTER CONCRETE FROM ACCURATE WATER CONTROL



Only Ransome Blue Brute mixers, large and small, have all metal spiral cut-offs in the water tank and non-by-passing valves for accuracy of water measurement throughout the life of the mixer.

There are many other reasons why Ransome Blue Brute Mixers have the reputation of making the best concrete at the lowest over-all cost, such as the famous Ransome mixing action perfected during 95 years' experience. The drum tracks of all Ransome mixers are made of high carbon steel for maximum resistance to wear; machined to a true circle after being welded to the drum. Drum rollers of tough car wheel metal, are equipped with double Timken bearings for permanent alignment to assure a smooth-running, long-lived machine with minimum maintenance.

For further details, read Bulletin *No. 181*, available from your nearby Worthington-Ransome Dealer or Blue Brute headquarters.

RB-16

BUY BLUE BRUTES

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute construction equipment will put your planning on a profitable basis and prove that *there's more worth in Worthington-Ransome.* Act now! His name is listed on page 120 The number beside his name indicates the Blue Brutes he handles.

1.
Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing & Grouting Equipment, Truck Mixers, Plaster & Bituminous Mixers, and accessories.

2.
Blue Brutes also include: Diesel, gasoline and electric driven Portable Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps.**

**Postwar Products

Truck Mixers
Capacities:
2, 3, 4½, 5½ cu. yds.

Portable Mixers
Capacities:
3½, 7, 10, 14 cu. ft.

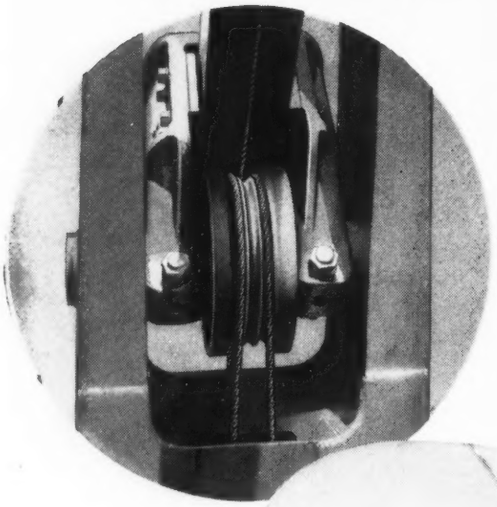
Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.

Pneumatic Placer
Capacity:
7, 14, 28 cu. ft.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division
Holyoke, Mass.

SECONDS SAVED
MEAN OUTPUT Gained



Balanced with hoist and swing to save vital seconds on every cycle, the Bucyrus-Erie rope crowd produces the kind of digging action that means more yardage. Whether the dipper is in close or extended to full reach and lift, whether it's empty or full, the operator has complete, positive control. Crowding and retracting are independent of all other functions, can be handled with regular rhythm for big output in shallow grading or in high speed loading — another factor in the outstanding performance record of ⅜-, ½-, and ¾-yard Bucyrus-Eries. And because the twin rope crowd eliminates many wearing parts, weight is kept down, maintenance reduced. Field conversion to crane-type front ends is easier, too, because the crowd drum is attached to the boom and comes off with it.

11E45

Positive independent twin-rope crowd does a lot to make Bucyrus-Eries tops in output. But there are plenty of other reasons, too. The full Bucyrus-Erie performance story will convince you.

So. Milwaukee **BUCYRUS ERIE** Wisconsin

What

"ENGINEERED FOR BALANCE"

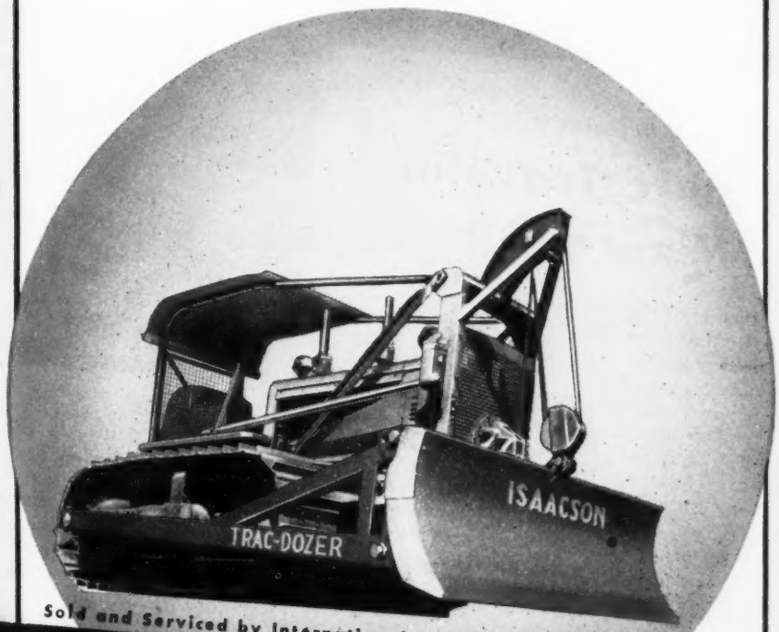
means to you!..

1. **GREATER ECONOMY OF OPERATION**
   Isaacson Equipment is "tailored" to your International TracTracTor for better performance, longer life, greater power and less tractor wear.
2. **GREATER PRODUCTION AND PROFITS**
   Isaacson Equipment is the modern method of speeding up production. You finish a job sooner, get a start on the next job quicker, and increase profits at every step.

For satisfaction, long wear, economy and dependability—

BUY ISAACSON FOR YOUR
INTERNATIONAL
TracTracTor

Detailed information is available on each unit of the complete Isaacson line of Tractor Equipment. Write for it today!



KABLE TRAC-DOZER

KLEARING BLADE

KABLE SUPER-ROOTER

SINGLE POWER UNIT

DOUBLE WINCHOIST

HYD. SUPER-ROOTER

HYD. TRAC-DOZER

KARRY-SKRAPER

DOUBLE POWER UNIT

TAMPING ROLLER

KARRY-ARCH

OIL WINCH

WINCHOIST

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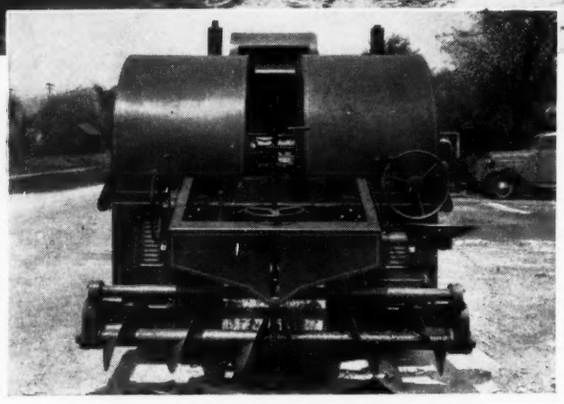
ISAACSON

Tractor Equipment

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

MOTO-PAVER

The Last Word in Asphalt Mixing and Paving



A Complete Traveling Asphalt Mixer and Paver

Engineered and built by America's oldest manufacturers of asphalt mixing equipment, the H & B MOTO-PAVER has been designed to meet the present day need for a highly flexible, mobile and efficient traveling mixer and paver in one self-contained, self-propelled unit.

The MOTO-PAVER mixes, spreads and lays any type of mixed-in-place bituminous material to any road width, thickness and crown condition. No separate loader, spreader or other paving equipment is required—no trailer to haul it from one job to another. The MOTO-PAVER does the *complete mixing and paving job,* and travels from one job to another under its own power.

Mounted on pneumatic tires, the MOTO-PAVER is powered by two gasoline engines—one driving the mixer and related units, the other driving the machine along the road. Paving speed is from 4 to 50 feet per minute, road speed up to 18 miles per hour. Mixing capacity is 100 to 120 tons per hour. The MOTO-PAVER will handle all but the highest types of bituminous concrete.

Especially suitable for resurfacing trunk roads and streets of smaller municipalities, the MOTO-PAVER is also an efficient unit for new construction work on roads, streets, airports, parking lots, driveways, etc. Bulletin MP-46, giving complete information and specifications, will be sent on request.

HETHERINGTON & BERNER INC.
735 Kentucky Ave., Indianapolis 7, Indiana

Hetherington & Berner

BUILDERS OF PORTABLE AND STATIONARY ASPHALT PLANTS OF ALL TYPES AND CAPACITIES

Gar Wood Cable Dozecaster

Gar Wood 2-Wheel Hydraulic Scraper

Gar Wood 4-Wheel Cable Scraper

GAR WOOD ROAD MACHINERY
WITH ALLIS-CHALMERS DIESEL POWER

up GOES YARDAGE *down* GO COSTS

Gar Wood earth moving units boost yardage to a maximum by superior maneuverability, ease of control and advanced design.

They push down costs by their high efficiency on the job and by staying on the job.

"Teamed-up" with Allis-Chalmers 2-cycle Diesel Tractors, they have the power to get jobs done most economically and quickly. Service is always promptly available.

These are some of the reasons for the increasing demand for Gar Wood Road Machinery, now the greatest by far in Gar Wood history—demand that has reached the proportions of a nationwide trend. Get the Gar Wood units that will push your yardage up and your costs down from your Allis-Chalmers dealer.

Down goes a 60-foot-high tree to the irresistible push of a Gar Wood Hydraulic Bulldozer

GW ROAD MACHINERY
is Sold Through
ALLIS-CHALMERS
Dealers Everywhere

ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

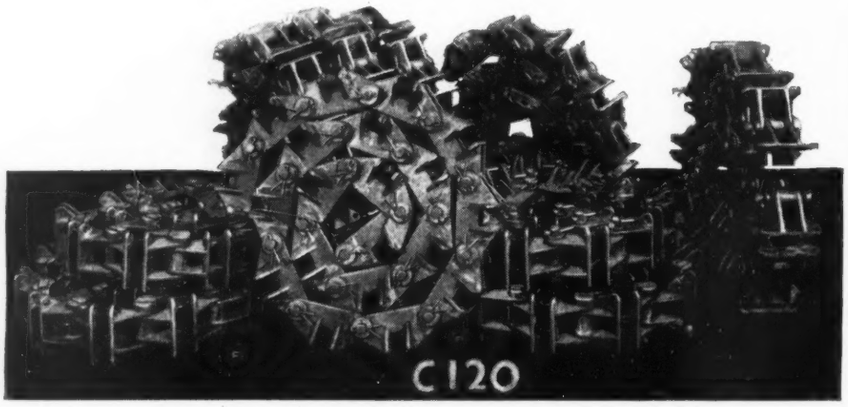
OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Here's A Practical Way to Test Manganese Steel Chain . . .

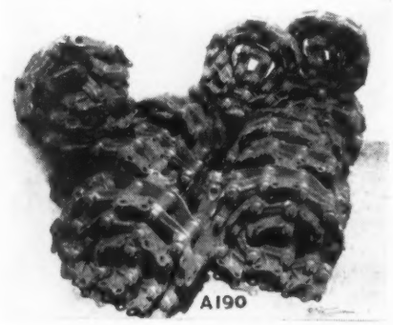
Austenitic manganese steel chain has an initial cost a little higher than ordinary chain, *but in the severest service it has given twice to ten times the service life*, which makes it highly economical in the long run. It is impossible to realize the difference in performance until you have actually used chain made of "the toughest steel known."

A convenient and practical way to ascertain whether manganese steel chain will save you money is to inspect the elevator and conveyor chain in your plant. Where you find weak links which will soon need replacement, order Amsco manganese steel links to replace them. Amsco chain ganese steel links with those you have been using, you can accurately determine which are lowest in ultimate cost. This experiment is well worth while, as it has pointed the way to substantial reductions in chain costs in steel plants, mines, cement, lumber and pulp mills, quarries and in general industry.

One reason for the superior performance of Amsco chain is found in the properties of austenitic manganese steel. Presenting a test-bar tensile strength of 125,000 lbs. p.s.i. (average test) and a developed-in-service surface hardness up to 550 Brinell, combined with a ductile, shock-resistant body metal, Amsco chains withstand for long periods abuse that quickly destroys chains of ordinary metals.



C-120. No. 830 conveyor chain with F-25 attachments made for an automobile manufacturer.



A-190. Ten strands of Amsco No. 847 pintle type chain with K-2 attachments every other link for a California cement mill.

and attachments are available in most standard types and sizes, all interchangeable with ordinary chain.

By comparing the life of the man-

Send for Bulletin 742-CN. "Amsco Manganese Steel Chain for Elevating and Conveying."

How Amsco-Nagle Centrifugal Pumps Resist Abrasion and Corrosion is detailed in Bulletin 940.

AMSCO

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Denver, Colo.; Oakland, Calif.;

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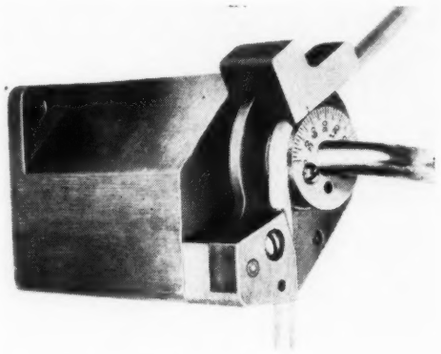
Offices In Principal Cities

AMERICAN MANGANESE STEEL DIVISION

CHICAGO HEIGHTS • ILLINOIS

AMERICAN Brake Shoe COMPANY

HAND-BENDING TOOL, which permits all kinds of small tubing to be curved at any desired angle, consists of sturdy steel base which may be used in a vise or clamped on to a bench; revolving radius rod equipped with handle for turning; stop block grooved to hold tubing; movable radius block which guides tubing around bend roll centered on top of base. This roll, cylindrical in shape and also grooved, has a top plate scribed in 360 deg. Measuring point is marked on movable radius block so grooved as to prevent crushing or change in section of tubing.

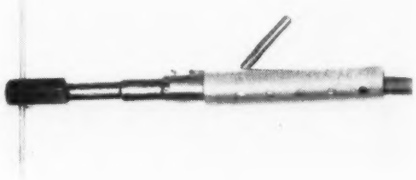


In operation tubing is inserted in groove of stop block and movable block which has been returned to 0 deg. Movable block then is pulled around bend roll, being connected to revolving radius rod, until measuring point is directly opposite mark of angle desired in bend roll. Allowances may be made for tubing having "spring back" characteristic by moving measuring point to as many degrees beyond desired angle marking as tube will spring back when released. Operator can measure this amount of allowance needed from spring back shown on top plate of bend roll when pressure on handle is released. Advantages of new device lie in great amount of time saved when compared to ordinary hand-bending operations, extreme accuracy to which tubing can be turned and material saving, as tubing is not crushed or split during operation.—**The Glenn L. Martin Co., Baltimore 3, Md.**

★ ★ ★

CARBON ELECTRODE HOLDERS cover range of manual welding and cutting from lightest work up to 500 amp. Carbon sizes from 1/8-in. through 3/4-in. Range is covered by four sizes of air-cooled holders from 13 1/2 oz., 150-amp. holder up to 64 oz. 500-amp. holder. Each size is well balanced when equipped with proper sized cables and cool running within their rated amperage and carbon capacity range. Simple plant-type cable connection. Holders for manual welding include four sizes, 150, 200, 300 and 500 amp. Positive "Hol-Grip" design with ample length and ventilation are fea-

(Continued on page 130)



ALL SET for that UNEXPECTED SHOCK!

As the seasoned Skier developed his ability to cope with unexpected shocks through experience, so it is with the making of Wire Rope . . . Experience in manufacture, *plus* quality of materials are necessary to produce a wire rope that can always be depended on to meet *unexpected* demands.

SINCE the first length of "HERCULES" (Red Strand) Wire Rope was made, its manufacture has always been guided by the demands of industry to meet the call for extra endurance, adaptability and the *unexpected strain* that emergencies develop . . . That's why so many wire rope users who demand the utmost in heavy duty performance, invariably specify "HERCULES" (Red Strand).

Made in Round Strand and Flattened Strand constructions—Preformed or Non-preformed, there's a type and construction to meet any Wire Rope requirement.

We invite your inquiries.

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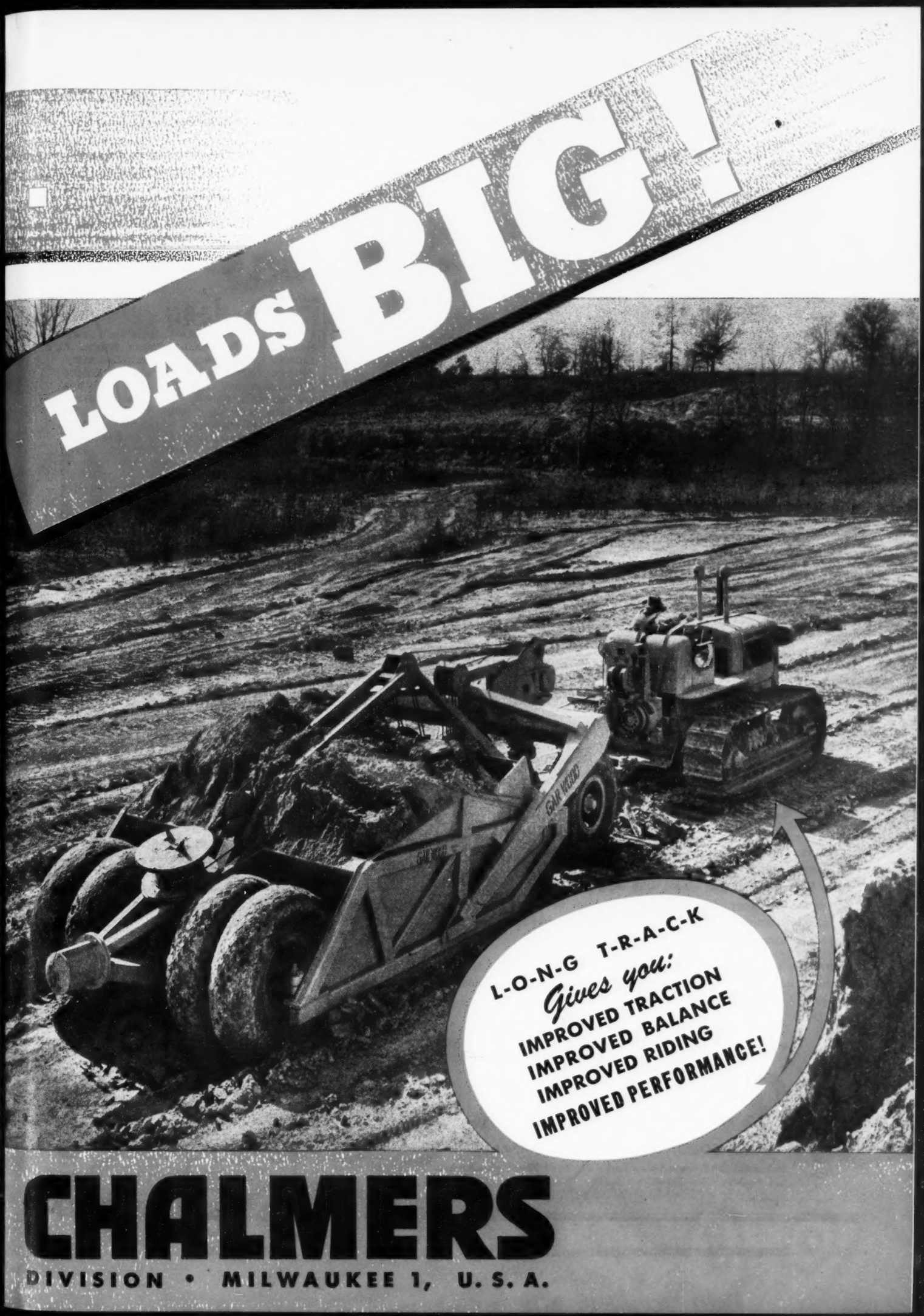
PROPERLY BALANCED HD-10 INCREASES YARDAGE MOVED

There's more dirt on the move with an HD-10 on the scraper. You can get big loads quick with this properly balanced tractor. There's sure traction with the long tracks and heavy truck frame . . . operation is steady, smooth. These features plus addition of an extra heavy front spring makes it ideal, too, for operating front or engine mounted equipment.

Whatever the job—scraper work, bulldozing or hauling . . . you will get more done at less cost with the HD-10. Whatever the soil condition . . . this ground-gripping tractor will give you better footing. It will pay you to get all the facts from your Allis-Chalmers dealer.

ALLIS-
TRACTOR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L-O-N-G T-R-A-C-K
Gives you:
IMPROVED TRACTION
IMPROVED BALANCE
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"INFERNO" STEAM HOSE

A GOODALL *"Standard of Quality"* PRODUCT

For years, construction men have relied on "Inferno" to meet every steam hose requirement with maximum efficiency and safety. Carcass combines high-tensile asbestos, mandrel cured, with wire and fabric . . . tough, durable, flexible. Tube provides exceptional resistance to high temperatures. *For added safety, special construction retards escape of steam should hose become punctured . . . there's no dangerous sudden burst.

"Inferno" is used for working pressures up to 200 lbs. and superheat steam temperatures not in excess of 400° F. Sizes: 1/2" to 2 1/2", in maximum lengths of 50 feet.

Contact our nearest branch or main office for details of this and other products by GOODALL . . ."On the Job LONGER!"

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Factory—Trenton, N. J. Established 1870

(Continued from page 126)

tures of this new line. Average carbon arc-welding job is done with either the 13 1/2 oz., 150-amp. holder or the 20 oz., 200-amp. unit. These units furnished with or without special "Quick-Attach" whip cables for short duration jobs. 300- and 500-amp. models suitable for heavy welding and cutting jobs.—**Tweco Products Co., Wichita 7, Kansas.**

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PULSING DRIVE provides single knob precision control of reversible motors, making it suitable for inclusion in all controlled motor devices. Recommended applications include precision control of valves, flaps, radio tuning elements, cranes, lifts, rollers, presses, machine tools and mixers—in fact any motor-driven equipment requiring more precise and flexible control than is afforded by ordinary pushbutton methods. Control action is as follows: Slow clockwise rotation of control knob results in corresponding motor motion in small increments; slow counter-clockwise rotation causes reverse motor rotation in small increments. Either operation permits controlled mechanism to be spotted accurately. Rapid rotation of knob causes faster motor motion and more extended travel. By depressing knob and turning it slightly right or left, continuous forward or reverse rotation of motor is accomplished.—**Yardeny Engineering Co., 105 Chambers St., New York 7, N. Y.**

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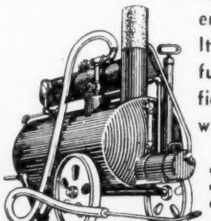
SIEBRING PORTABLE-OIL BURNING STEAM CLEANER

Saves Man Hours!

Cuts Repair Time!

Your repair shop or maintenance department can save many precious man-hours using the low cost, portable Siebring Steam Cleaner. Instant steam cleans faster and cuts repair time. It's automatic, burns fuel oil, natural or artificial gas. Its low cost will surprise you.



- *Portable, easy to move.*
- *Sturdy construction.*
- *Safe to use.*

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You risk nothing. Sold on 10 day FREE TRIAL basis. Write for full details.

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Write today for complete and illustrated descriptive material on this remarkable steam cleaner. Address your inquiry to Dept. 700.

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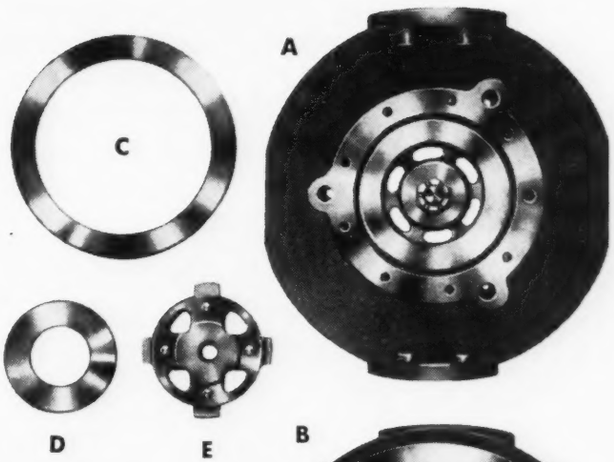
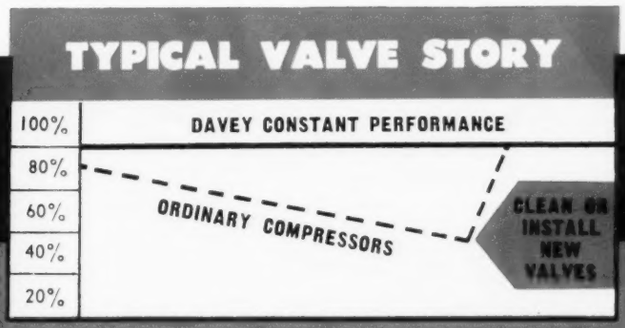
These are Vital Parts of the Davey Valves that assure permanent peak efficiency



TYPICAL VALVE STORY

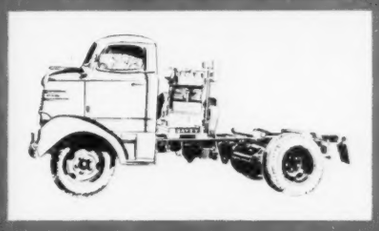


Look at the husky parts above and you'll see why Daveys built 5-10-15 years ago are running today with their original valves . . . why Davey is the only compressor with guaranteed LIFETIME VALVES.

"A" is the top of the Davey aluminum alloy cylinder head, "B" the bottom. "C" is the extra-capacity intake valve that fills cylinders fast for highest operating efficiency. "D" is the discharge valve and "E" the valve buffer. Davey owners seldom see these parts because they last . . . and last . . . and keep on delivering full volume of air.

See your Davey dealer today. Ask him to tell you more about LIFETIME VALVES. Ask him, also, about Auto-Air, the modern truck mounted compressor driven by the truck engine through the Davey Power Take-off. This unit occupies less than 1/3 of the truck body space, leaving the remainder for men, tools, materials . . . is today's best compressor buy.

DAVEY AUTO-AIR



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DAVEY COMPRESSOR CO., KENT, OHIO

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"Engineered-to-the-Service"

For all uses and models of trucks—with PERFECTION Hydraulic Hoists.

"Cushion-drop" hoist mechanism --lowers body without shock.

Type 7400 Series STAKE BODY

1. Tapered bolsters give exceptionally low mounting height, only 1⅜" higher with hoist than without it.
2. Fully adjustable sills to accommodate various frame widths.
3. Extended upper edge of side and end rails provides maximum rigidity and protective rub-rail.
4. Doubly reinforced stake bottoms.

Type 100 Series DUMP BODIES

1. Styles and sizes for all classes of dump truck service.
2. No. 8 or 10 gauge high-resistant steel body shell, securely welded to heavily braced understructure.
3. Double-acting tail gate.
4. Adjustable spreader device.

Write for prices, bulletins, and names of nearest distributors.

THE PERFECTION STEEL BODY CO.
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TRUCK BODIES AND HOISTS

ALUMINUM WHEELS instead of bomb hoists are now built by this company for use on hand trucks, dollies and all rolling industrial equipment. Units are cast solidly of this light metal and have hard rubber

tires molded firmly to them by a new process. Available in 6-, 8-, 10- and 12-in. dia. and weighing as little as 3 lb., they are built to carry 40 percent more weight than any other wheel of equivalent size. Equipped with Timken tapered bearings which require no lubrication during life of wheel.—**Northrop Gaines, Inc., Hawthorne, Calif.**

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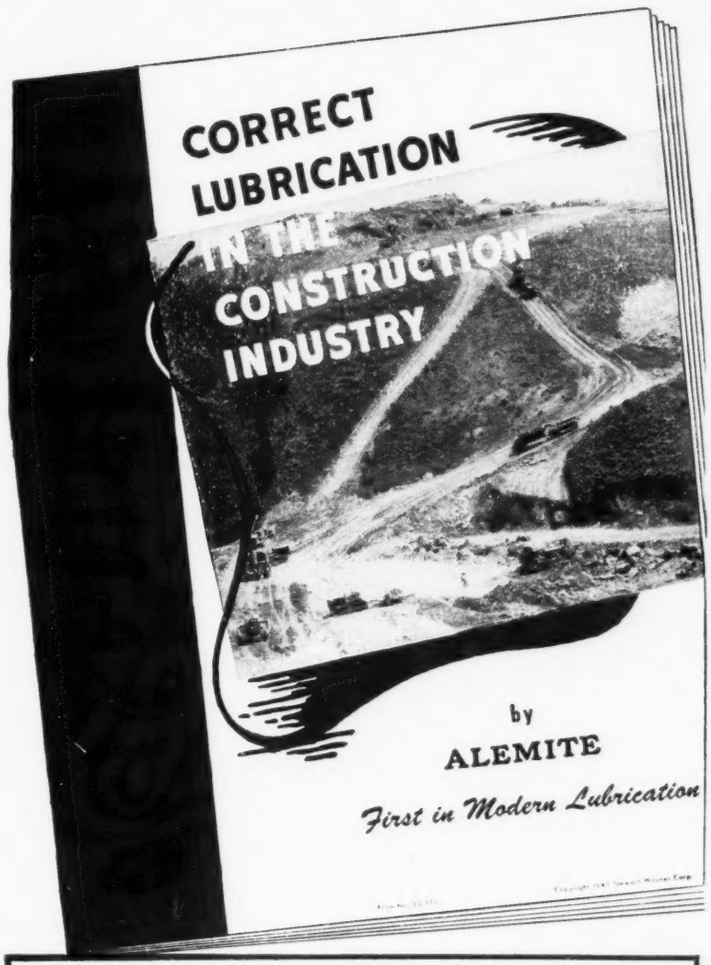

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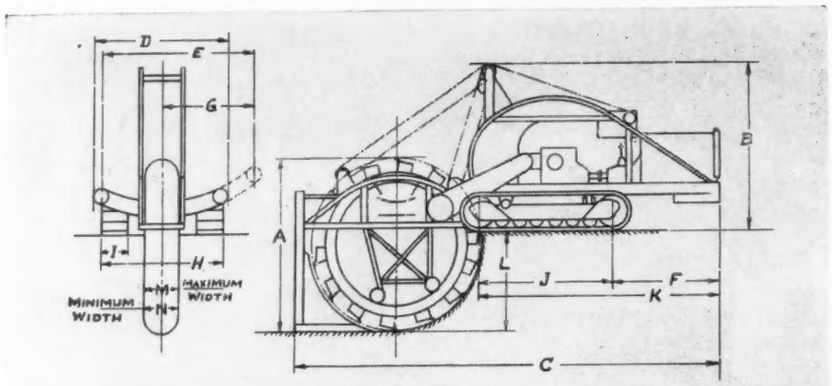

A	B	C	D	E	F	G	H	I	J	K	L	M	N
9'-8"	9'-4"	23'-9"	7'-7"	8'-5"	6'-0"	5'-0"	6'-10"	18"	7'-6"	13'-6"	5'-6"	26"	15"

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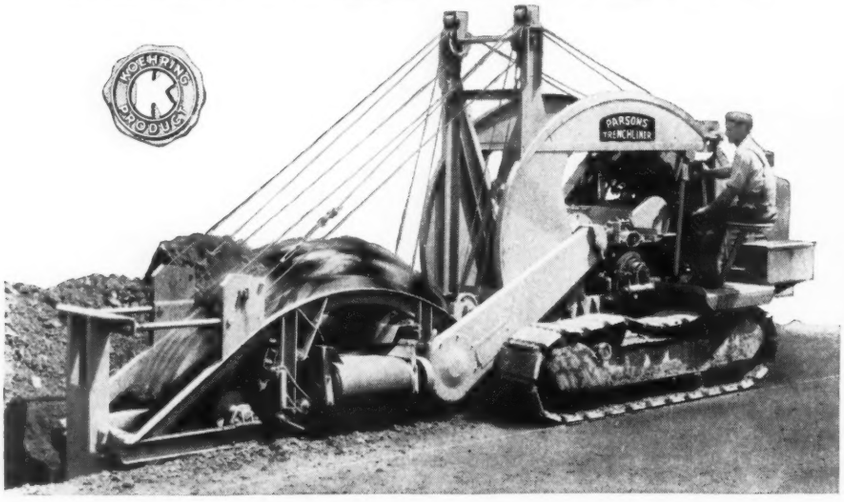
DIGGING WIDTHS	Buckets only: 15" 18" 21"
	With side cutters: 20" 23" 26"
DIGGING SPEEDS	25 — from 2.5" to 118" per min.
TRAVELING SPEEDS	5 — from ½ to 2.7 M.P.H.
CONVEYOR BELT SPEEDS	5 — from 45 to 330 feet
WHEEL SPEEDS	5 — 36 to 266 feet per min.
POWER	Gas — Waukesha 6 cyl., 55 H.P.
	Diesel — Caterpillar 4 cyl., 45 H.P.
	Diesel — International 4 cyl., 45 H.P.
TRACTOR TYPE CRAWLERS	Optional equipment for pipeline work.
TILE BOX	Optional — for tile laying.
SPECIAL GUMBO LIP	Optional — replaces teeth for digging in gumbo.



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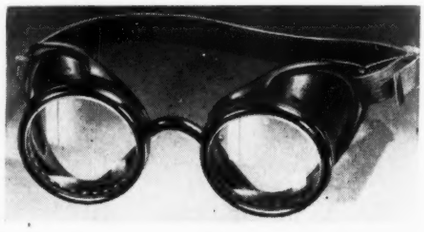
PARSONS COMPANY

KOEHRING SUBSIDIARY **NEWTON, IOWA**

TRENCHING EQUIPMENT PARSONS

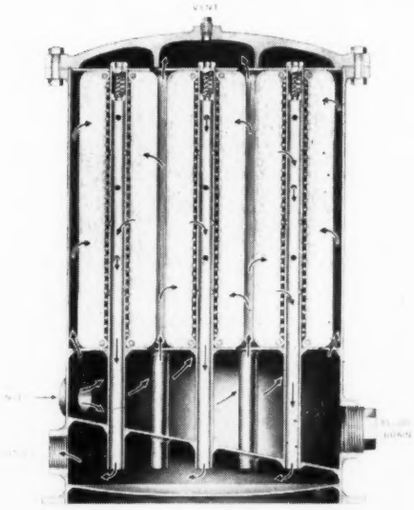
DUST GOGGLE which provides greater safety and comfort for industrial and other workers, is equipped with an acetate eye-cup that permits wider angle of vision and is more comfortable to wear. Thin wire mesh screen on inside of each side shield



gives maximum protection against fine dust particles. Individually shaped to conform to contour of right or left eye. Fits snugly against face to keep out dust and powder. Ventilating system extends over large area to reduce possibility of fogging. Fine wire mesh screens prevent dust from reaching eye. Easily cleaned by blast from air hose or thorough washing. Equipped with clear Super Armorplate lenses, goggle's retaining rings are of solid fiber. Goggle also available with rubber cushion.—**American Optical Co., Southbridge, Mass.**

★ ★ ★

OIL CONDITIONERS, scientifically designed to clean and condition oil in capacities up to 47 gpm., removes acids, gums, varnish, moisture, carbon and dirt without destroying modern oil additives. Built of heavy-gage welded steel shell with special heavy



cast-iron cover. Flanged connections are available, if desired. Oversize sump is supplied in order that heavy sludge conditions may be controlled without overtaxing elements. Adequate cover gasket surface is furnished, eliminating oil leaks. Covers equipped with vent opening for use in dry sump installations. All units bypass equipped and designed to be used either as full-flo in-line or shunt type conditioners. Height 27¼ in.; dia. 18½ in.; number of bypassed valves 7; lowest recommended temperature, 140 deg. F.; recommended pressure, 30 psi.—**Winslow Engineering Co., Oakland 8, Calif.**

If you needed

A MILLION DOLLARS

COULD YOU RAISE IT IN LESS THAN 30 MINUTES?

A contracting firm had bid successfully on a large construction job. They realized that yesterday's methods would not meet today's needs . . . new equipment would be needed to handle the job . . . and the investment would total over a million dollars.

This well-financed company decided that it would be an advantage to borrow this money and amortize the loan over many months . . . let the new equipment pay for itself . . . leave their working capital unimpaired for supplies, payrolls, operating.

The details were laid before C.I.T. and . . . IN LESS THAN THIRTY MINUTES all arrangements were completed for a loan of over a million dollars! Of course it isn't always possible, under all circumstances, to arrange a loan in such a short time. However, the celerity with which this transaction was handled is typical of C.I.T. business methods.

This case history is not unusual. C.I.T. has made similar loans to industry . . . often on short notice . . . with repayment terms which retire the obligation over periods of months or years. C.I.T. is prepared to arrange financing in large or small amounts to fit the needs of almost any business.

HERE'S HOW C.I.T. GRANTED SUCH A REQUEST . . . AND IN LESS THAN HALF AN HOUR!

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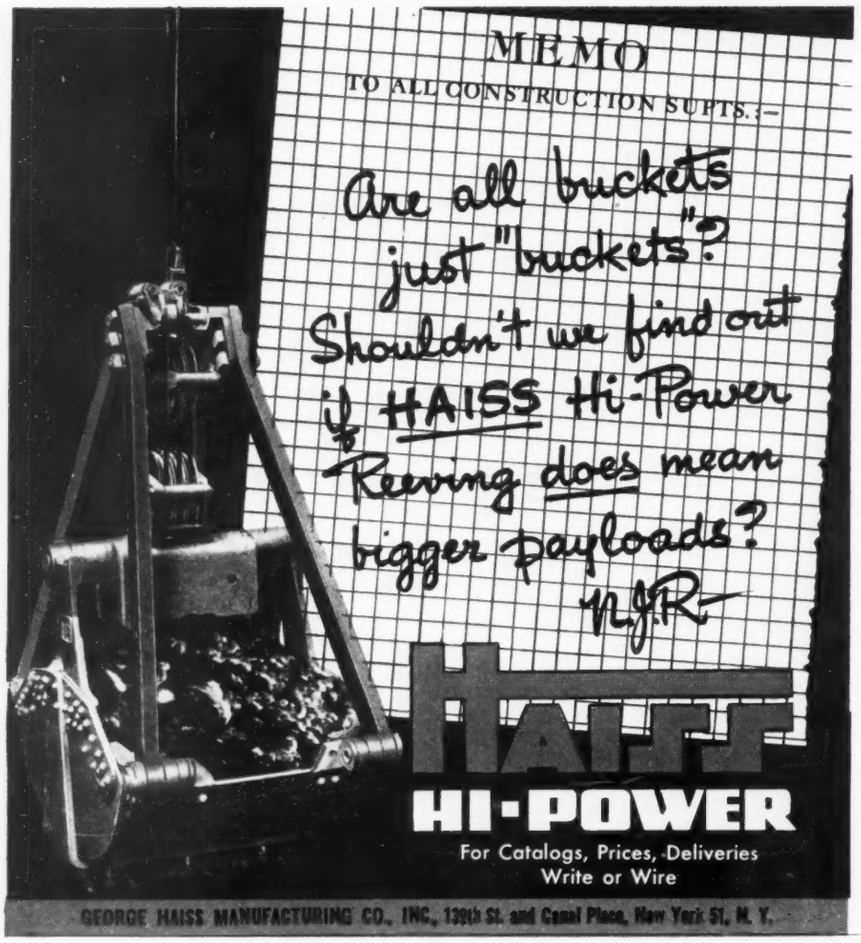
C.I.T. CORPORATION

INDUSTRIAL FINANCING

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED


MEMO
TO ALL CONSTRUCTION SUPTS.:—
Are all buckets just "buckets"?
Shouldn't we find out if HAISS Hi-Power Reeving does mean bigger payloads?
M.J.R.
HAISS
HI-POWER
For Catalogs, Prices, Deliveries
Write or Wire
GEORGE HAISS MANUFACTURING CO., INC., 139th St. and Canal Place, New York 51, N. Y.

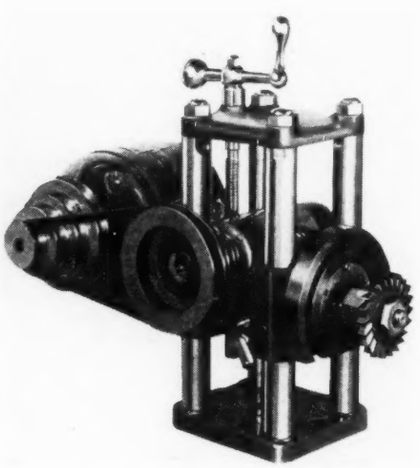
MATCHED GEAR PULLERS, providing tools to cover wide range of pulling utility, include three sizes with maximum jaw capacities of 4½, 8½, and 14 in. Small and medium sizes also are available in slide-hammer design. Yoke and jaw construction identical on all models with powerful spring-controlled jaw lock designed to provide safe, slip-proof and tip-proof grip on part to be pulled. Long jaws allow use of puller where shaft extends some distance through gear or other part to be removed and are slenderized to permit work in close quarters. Hexagon end on standard model pressure screws can be turned with standard wrenches. Two smaller sizes take ¾-in. wrench; large model a 1-in. wrench. On slide-hammer-type pullers centralized, guided shock of booster hammer, combined with screw tension, provides pulling force. Distributes pull equally, and removes part safely and quickly.—**Snap-on Tools Corp., Kenosha, Wis.**

★ ★ ★

MORTAR CEMENT is recommended by its manufacturers to masons, bricklayers and masonry contractors because it has maximum water-retention, excellent workability, durability, high-strength and permanent bond combined with high sand-carrying capacity and pleasing color.—**Huron Portland Cement Co., Ford Bldg., Detroit, Mich.**

★ ★ ★

UNIVERSAL METAL WORKING MACHINE, known as Master Lathe Converter, is an attachment, mounted on a lathe, which makes practical whole range of machine shop operations ordinarily requiring a variety of standard machine tools. Converter, which is equipped with its own power, can turn shafts and other circular forms; cut keyways, both external and internal; cut and grind gears, threads, worms and screws; develop internal and external splines; form square or hexagonal sections on shafts; do high precision internal and external, as well as surface grinding, boring and facing, and precision drilling of holes, either at angles to the axis of a shaft or spaced around a hub center. Basic unit, which will mill, cut keyways and do angular drilling

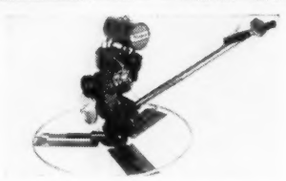


(Continued on page 138)

SHORT OF SKILLED "FINISHERS"?

Whiteman Concrete Equipment is the answer . . . for better, compact and level slabs . . . with machine economy. The portable Lightweight Rodding Machine shown above is Model "RS" . . . for slab widths 3 to 12 feet. Also in Model 44 . . . for slabs 10 to 20 feet. HAND GRILL TAMPER, at left, tamps down larger aggregate.

Write or wire for details and nearest distributor.



LIGHTWEIGHT FLOATING-FINISHING MACHINE MODEL "J" . . . the "perfect" mechanical troweling machine. 35" diameter. Also in 45" diameter.

Whiteman MANUFACTURING CO.
3249 Casitas Avenue Los Angeles 26, California

WE make these surveys right along, and they result in a common-sense plan to assure correct application of the right lubricants. Briefly, this is what the Shell Lubrication Engineer will provide:

1. Survey and analysis of the lubrication requirements of your plant engines and machines.

2. Recommendations of proper lubricants, together with specific instructions as to when and how they should be used.

3. Scheduled check-ups for all critical or unusual machinery.

4. Reports (if you want reports) about the performance and economies of recommended lubricants in use in your machines. To the Shell Lubrication Engineer, though, the best report is short and sweet: "All machines continuously in service, well lubricated."

* * *

Right here we ought to warn you that the Shell Lubrication Engineer isn't going to tell you everything you're doing is wrong—he may, in fact, find very little fault with the lubricants and procedure you are now using.

Then, too, he will come to you without a rigid set of rules. Your lubricating procedures are probably based on pretty sound experiences that your own folks have had. Your problem is really one of picking out the weak spots before they become trouble spots . . .

So call the Shell Lubrication Engineer for that survey. If your property is so large that he needs help, he will have it. You are bound to gain, if it is only peace of mind!

There is no obligation on your part.

Call your local Shell Representative, or write Shell Oil Company, Incorporated, 50 W. 50th Street, New York 20, N. Y., or 100 Bush Street, San Francisco 6, California.

SHELL INDUSTRIAL LUBRICANTS

SHELL

NO WAITING!
NO DELAY!

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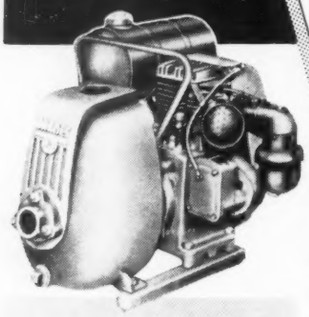
GOLDEN JUBILEE 1895 1945 50 Years of Progress



GET going on your job immediately. No waiting—no delays in getting a pump from Barnes. You can have 1 or 100 of the Barnes 2-inch (7M) Automatic Centrifugal Pumps shipped to you from stock immediately upon the receipt of your order.

Barnes' ability to produce these finer and better 7M Pumps in volume will extend to other sizes in the complete line (3,000 to 90,000 G.P.H.) of Barnes Automatics, as the days pass. And remember, no finer, no better pumps can be had—for Barnes Automatics are the pumps that deliver "MORE GALLONS OF WATER FOR YOUR PUMPING DOLLAR."

THE STREAK (7 M)

For quick handling to and from and on the job, the Barnes Streak (7 M) is your answer. Automatic-prime, base-mounted, or equipped with wheels, and powered by the dependable Wisconsin AB engine. Bail-type handle makes moving easy. And remember — it's shipped from stock — immediate delivery — no waiting.

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all widths and plys

V-BELTS all sizes

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AIR	WATER	SUCTION	COMPRESSOR
FUEL	STEAM	WELDING	PILE DRIVERS
FIRE	VACUUM	DISCHARGE	ROAD BUILDERS

and BOOTS, DREDGE SLEEVES, PUMP DIAPHRAGMS, ETC.

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(Continued from page 136)

is supplied with interchangeable heads to do other varied machine operations. With converter, small shop containing drill press and lathe can handle any type of machining normally required. Made in three sizes

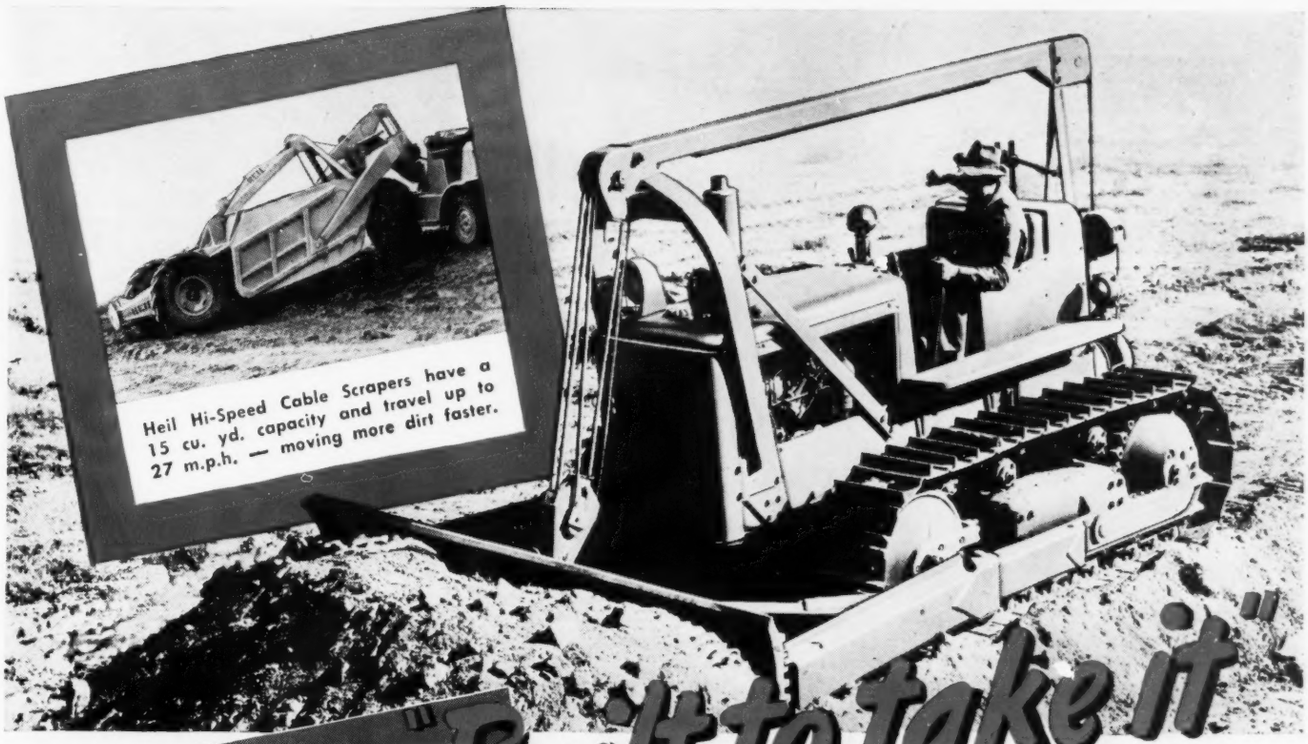
adapted to all bench and engine lathes ranging in size from 9- to 36-in. swing. Converter can be mounted on any make of lathe in tool post position on either compound rest or cross-slide of carriage with compound removed.—**Master Manufacturing Co., 1314 East Avenue A, Hutchinson, Kan.**

★ ★ ★

FLANGE-JACKS, for replacing gaskets in flanged pipelines eliminate hazardous hammer and chisel method, opening or closing pipe without damage to flange faces and without danger from sparks—an important factor when working on inflammable lines or

in presence of gas fumes. Danger to personnel from chips and flying wedges also is eliminated. Operates with minimum of labor and exerts tremendous pressures smoothly and evenly, eliminating vibration along

(Continued on page 142)

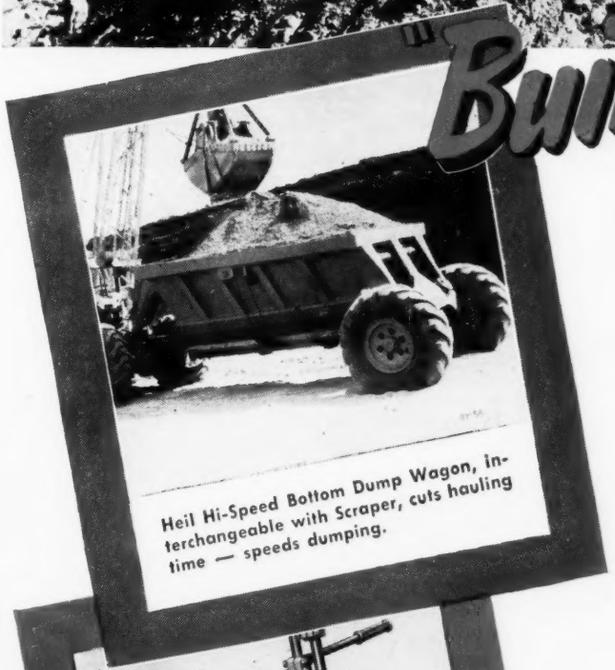


Heil Hi-Speed Cable Scrapers have a 15 cu. yd. capacity and travel up to 27 m.p.h. — moving more dirt faster.

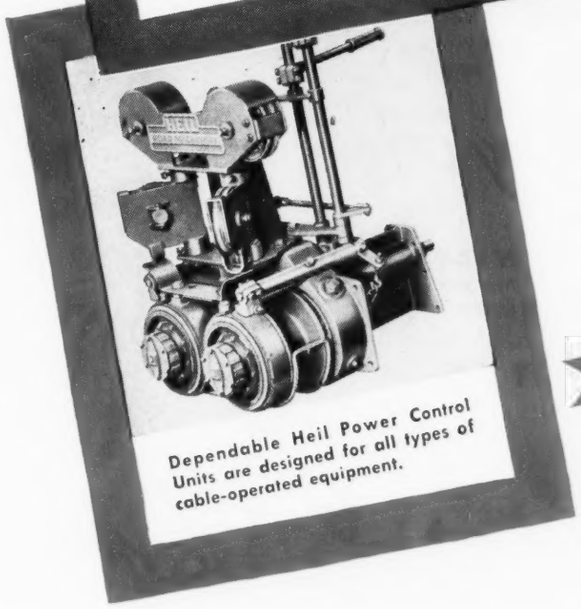
"Built to take it"

Heil Cable Dozers

deliver outstanding "on-the-job" performance



Heil Hi-Speed Bottom Dump Wagon, interchangeable with Scraper, cuts hauling time — speeds dumping.



Dependable Heil Power Control Units are designed for all types of cable-operated equipment.

To move "pay dirt" quickly, easily, and economically, Heil Cable Dozers give you these "job-designed" features:

The center-lift construction assures full visibility. 60% of the moldboard is visible at all times . . . your operator can work quickly and accurately. Short push-arms at center balance point provide greater down-pushing pressure on blade cutting edge, for maximum penetrating power. Down pressure at center point of tractor keeps track at full length on ground, utilizing entire drawbar horsepower of tractor. There are dozens of other features that make famous Heil Cable Dozers perform like champions. . . . You're money ahead from the very start when you specify Heil Quality-Built Cable Dozers. Write for bulletin or R-62

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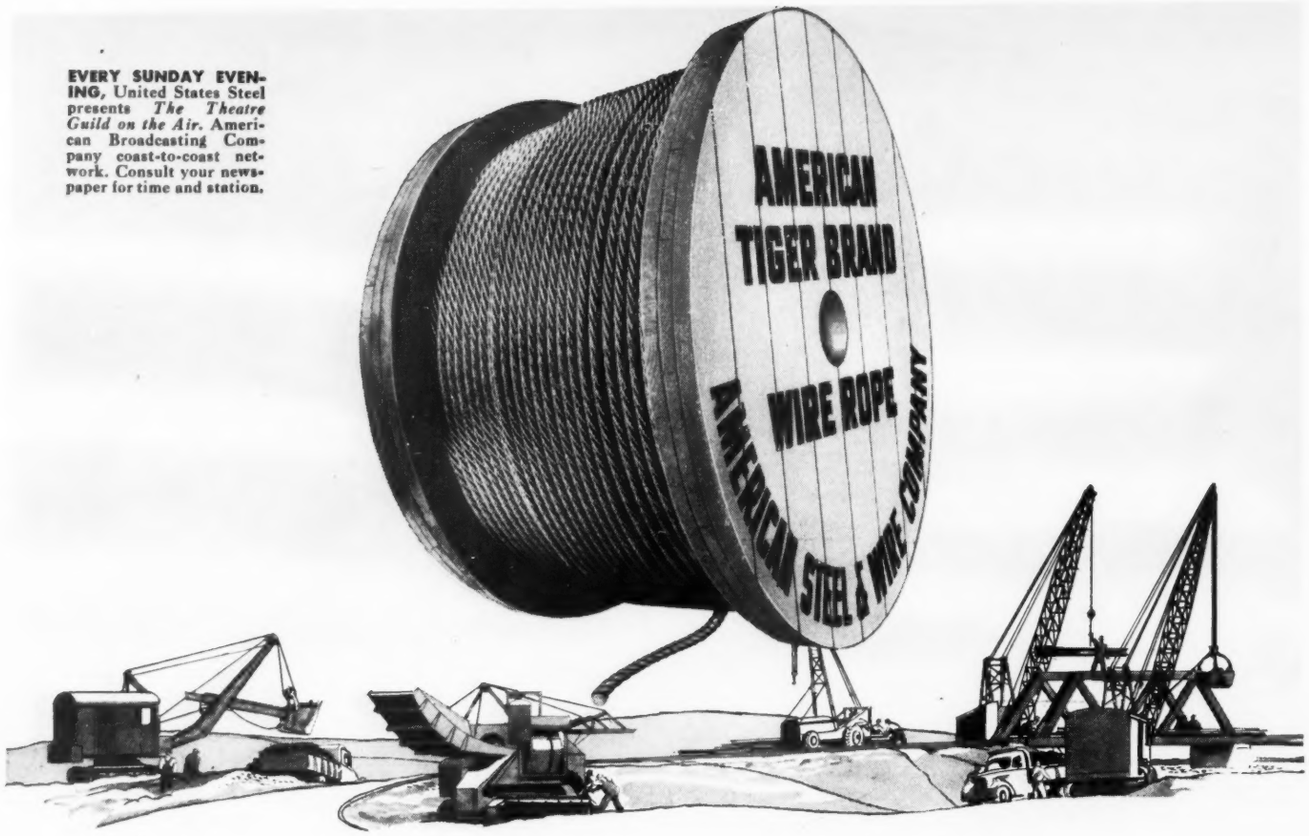
EVERY SUNDAY EVENING, United States Steel presents *The Theatre Guild on the Air.* American Broadcasting Company coast-to-coast network. Consult your newspaper for time and station.



First— in the Construction field

MADE by the world's largest manufacturer of wire rope, U·S·S American TIGER BRAND Excellay Preformed has the stamina to handle the toughest construction job.

This superior wire rope is made of high tensile wire from select U·S·S Steel. It is extra strong, extra tough, extra flexible. And its Excellay Preformed construction means each wire and strand carries its full share of the load.

TIGER BRAND is easy to handle . . . has less tendency to loop or kink . . . can be installed quickly . . . requires shorter breaking-in time. It hugs the sheave grooves and drums . . . has high resistance to bending fatigue and abrasion . . . stands up under long, hard service. It is safe . . . crown wires lie flat and in place when broken . . . jagged wires do not stick out.

You can depend on TIGER BRAND to help reduce maintenance and replacement costs . . . to do a more efficient job in every operation requiring wire rope . . . for back of every reel of TIGER BRAND are the vast research, engineering and production resources of the great mills of United States Steel. You can't buy finer wire rope at any price. So, look up your nearest TIGER BRAND dealer now.

Excellay Preformed

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UNITED STATES STEEL

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TIGER BRAND *Wire Rope*

LINK-BELT SPEEDER LS-50

Another "Many Purpose" Machine!

DRAGLINE

CLAMSHELL

TRENCH HOE

SHOVEL

All illustrations of LS-50. Other models up to 3-yd.

FIRST ON THE JOB— LAST TO LEAVE— LINK-BELT SPEEDER Keeps Profitably Busy

Like all members of the LBS family, this ½-yd. "Shovel-Crane" is readily adaptable to many different material-handling jobs.

Power, easy handling and wide range of usefulness, make this machine a real money-maker. Contractors and highway departments in all parts of the country will find it advantageous to consider a LINK-BELT SPEEDER in their future plans!

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LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

(Continued on page 138)

pipeline and possibility of causing new leaks in nearby joints. Flange-jacks open joints against load of 15 tons without damage to flanges. As pressure is exerted, flanges open evenly without shock and bolt holes are maintained in continuous alignment. Closures are accomplished in similar manner. Simple in design. Jaws are heavy one-piece steel forgings. Screw points are case-hardened. Standard sizes open all 2- to 20-in. flanges and are claimed to hold them in perfect alignment. Eliminate costly shut-downs, make possible fast economical repairs in hard-to-get-at locations and offer maximum protection to personnel and plant. —**T. G. Persson Co., 224 Glenwood Ave., Bloomfield, N. J.**

★ ★ ★

NEW ROCK-BLASTING METHOD, called "Rockmaster," is designed around a new type of electric blasting device. System requires changes in blasting procedure such as spacing burden and selection of explosive for particular rock formation. Advantages: (1) In many quarries secondary blasting is of primary importance; new system gives substantial reduction due to superior fragmentation; (2) reduction of "back-break" leaving clean rock face after blast and reducing difficulty in drilling for subsequent blasts; (3) minimizing of vibration from blast —as many as 20 holes may be fired simultaneously without objectionable vibration. New method pushes out rock ready for shovel when full buckets mean more rock produced.—**Atlas Powder Co., Wilmington, Del.**

BLAW-KNOX STEEL FORMS WIN RACES

Races against time and penalties—

Races against personnel uncertainties—

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Build with Blaw-Knox Steel Forms and you soon establish a reputation for winning races—a reputation that will bring you more jobs and more profitable contracts.

Whether your job is large or small, you should investigate the advantages of Blaw-Knox Steel Forms, and you will want to use the time-saving money-making methods explained in the Blaw-Knox Steel Forms Bulletin No. 2035.

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On Your Letterhead

For the man who builds TUNNELS, SEWERS, WALLS and other concrete structures

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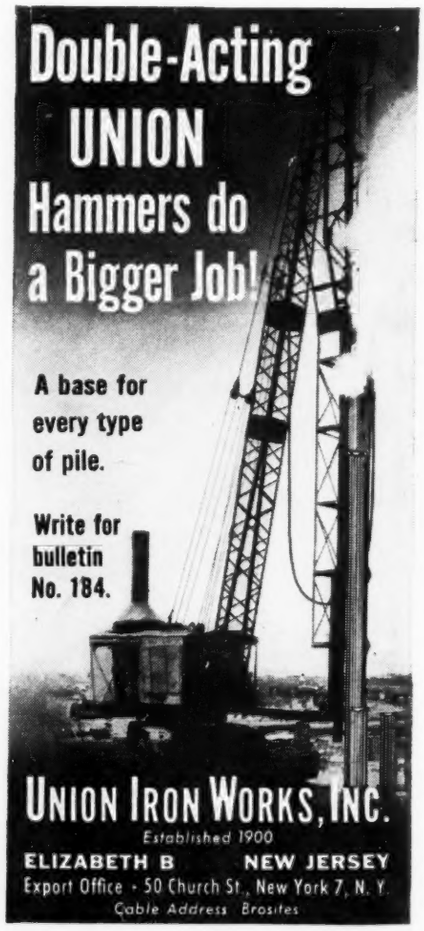
2086 FARMERS BANK BUILDING
PITTSBURGH, PENNA.

BLAW-KNOX STEEL FORMS

Double-Acting UNION Hammers do a Bigger Job!



A base for every type of pile.

Write for bulletin No. 184.

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HUNDREDS of tire-wise commercial car operators are now acutely aware of this important fact: *you can't buy a better tire than an Armstrong!* Since 1912 Armstrong has pioneered in making tires that wear longer and cost less. You can count on Armstrong to give you a tire that will perform better, last longer, stand up under all conditions and cost you less per mile of use. That's not a statement—it's a promise!

For literature or information write your Armstrong Distributor or to Armstrong Rubber Company.

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ANY SHOVEL MADE
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With Blades of
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Moly Shovels, spades and scoops are made in all required types, styles, sizes and weights.
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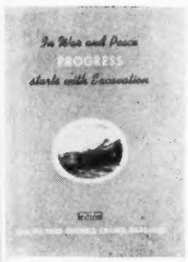
ALLOY
SHOVELS

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.



EXCAVATION IN WAR AND PEACE—**Bucyrus-Erie Co.,** South Milwaukee, Wis. (36 pp., illustrated) Describes basic part excavating has played in building all over world. Tells how earthmoving industry prepared ground work for defense, aided in construction of advance bases, and worked on fighting fronts. Predicts progress in postwar period. Contains dramatic photographs of shovels, draglines and cranes.

★ ★ ★

SIMPLIFIED PRACTICE RECOMMENDATION—**National Bureau of Standards,** Washington, D. C. Entitled "Metal Lath (Expanded and Sheet) and Metal Plastering Accessories." Recommendations are greatly simplified and standardized. Eliminates 216 items from former standard line. Copies, priced at 5c., are available from Superintendent of Documents, Washington 25, D. C.

★ ★ ★

AUTOMATIC CENTRIFUGAL PUMPS — **Barnes Mfg. Co.,** Mansfield, Ohio. (22 pp., illustrated) Contains full-color illustrations of each model, complete details of applications, and performance tables. Covers special construction features of new line. Carries complete catalog specifications and comprehensive visual sales presentation for convenient use by distributor salesman. Final section gives simplified information on how to select right pump for job.

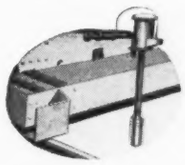
★ ★ ★

SAFETY CONTROL OF DIESEL ENGINES—**Viking Instruments,** Stamford, Conn. (data sheet R-18) Announces safety control system for shut-down of diesel engines when temperature of circulating water system becomes too high or where there is insufficient lubricating pressure. Contains complete information on operation, with detailed drawings of general arrangements, installation and operating instructions and ordering information. Control system is self-operating and requires no electrical power or additional facilities.

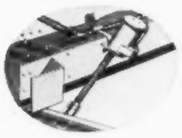
The battery of *high-speed* VIBER VIBRATORS is one-man operated. A single hydraulic control valve raises or lowers the vibrators as a single unit, for efficient operation in desired positions.

FASTER CONSTRUCTION OF SUPER HIGHWAYS AND RUNWAYS

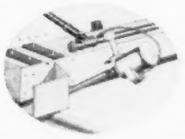
To meet the demand for increasingly better quality in concrete construction, at ever lower costs, no method can approach the efficiency of the new VIBER SLAB. More than ten years of practical research and experiment were devoted to the problem of perfecting fast and positive compaction of concrete in large masses and the VIBER SLAB is the widely acclaimed result. The VIBER SLAB has won immediate acceptance and has already been proven on many major projects.



(A) Viber Vibrators extended in upward position, giving ample clearance to pass over joint, manhole covers or other obstacles.



(B) Position of Vibrators starting under oscillating screed.



(C) Position of Vibrators submerged under oscillating screed to full depth of concrete slab.

AS FAST AS IT CAN BE PLACED, even the stiffest concrete of super-thick slabs can now be economically vibrated *full depth,* for uniform density and strength. Higher quality concrete, with substantial savings in time, labor, construction and maintenance costs result from use of the VIBER SLAB. This multiple unit, high-speed internal vibrating machine is specially designed for *continuous full width,* full depth compaction of slabs up to 25 feet. The VIBER SLAB requires but a single operator and may be attached to most types and makes of spreading and finishing equipment. A battery of correctly spaced VIBER VIBRATORS give you the unequalled speed, *in concrete,* of 9,500 RPMs, and test borings prove their unmatched compacting efficiency. Full details will be furnished upon request.

VIBER SLAB

MULTIPLE HIGH-SPEED INTERNAL VIBRATION

VIBER COMPANY • 726 South Flower St. • Burbank, California

ORIGINATORS OF INTERNAL CONCRETE VIBRATION!

Both Up and Down!

Yes - - you can

Raise Efficiency
Pull Down Costs

and eliminate unnecessary employee fatigue with these light-weight, portable, economical

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STERLINGS EXCEL!

Plan NOW to Use these BETTER BARROWS as Soon as They are Available!

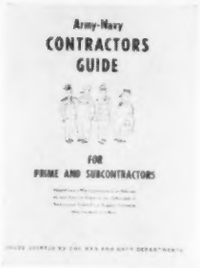
Carefully examine every detail of a Sterling Wheelbarrow—tray, braces, wheel, legs and handles. You'll find that Sterlings are engineered and built to take hard punishment over a long period of years. Right now, the demand for Sterlings exceeds the supply. But we are looking forward to the time when we can again take care of your normal barrow requirements.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

ARMY-NAVY CONTRACTORS GUIDE — **Readjustment Distribution Center,** War and Navy Departments, 90 Church St., New York 7, N. Y. (60 pp., illustrated) Suggests methods of advance planning and illustrates practical procedure for settlement of terminated fixed-price supply contracts with Army and Navy. Gives chronological picture of war contractor's course of action from time contract is terminated to final settlement. Specimen forms are reproduced and filled in with data from hypothetical case. Divisions include: (1) How to apply settlement procedures; (2) How to plan now for termination later; (3) How to use standard proposal forms; and (4) Where to consult Army and Navy field officers. Copies are available without charge.



★ ★ ★

ELECTRICAL AND AUTOMOTIVE PRODUCTS—**Wagner Electric Corp.,** 6400 Plymouth Ave., St. Louis 14, Mo. (16 pp., illustrated) Describes company's entire line of electrical and automotive products: Motors, transformers, industrial brakes and controls, hydraulic brakes, air brakes, tachographs (speed-recording speedometers), NoRol (safety accessory), brake lining, and brake-service tools. Also included are pictures of 29 sales and service offices and air view of factory.

★ ★ ★

DIESEL FACTS—**The Diesel Engine Manufacturers Association,** 1 No. LaSalle Street, Chicago 2, Ill. (12 pp., illustrated) Recognizing the growing demand for diesel engines for producing power in municipally owned power plants, this association has issued the first of a series of booklets covering the use of diesels in this field. Special section treats of procedure to be followed by city desiring its own power plant. Another section outlines use of diesel engines in generating projects of the Rural Electrification Administration. Future booklets to be issued will deal with diesel engine applications in ships and boats, locomotives, the oil industry and various stationary usages.

★ ★ ★

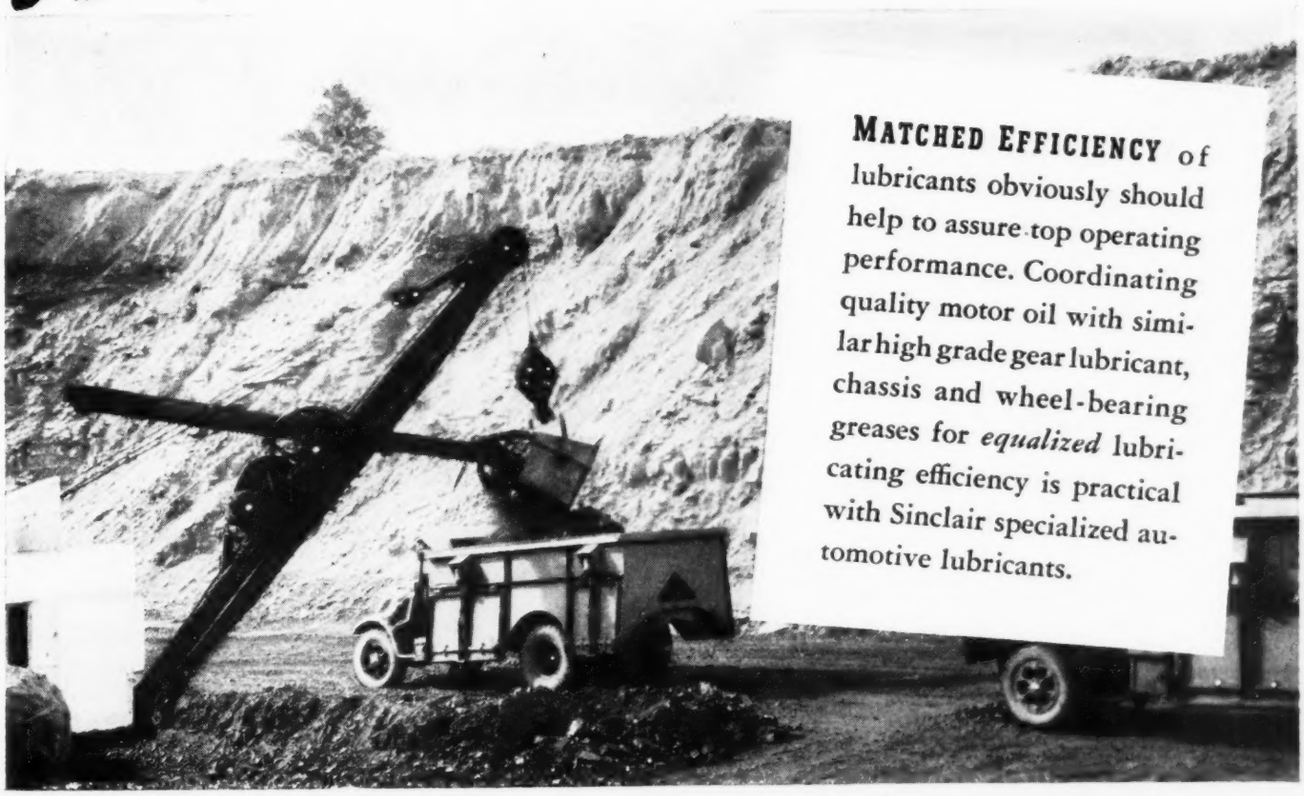
ONE-MAN PORTABLE POWER SAW—**Harry A. Lowther Co.,** 141 W. Jackson Blvd., Chicago 4, Ill. (4-p. illustrated folder) Explains use of C-saw in felling timber, bucking logs, cutting limbs, and clearing land. Features balanced frame, easy-rolling wheels, heavy-duty tires, new-type saw blade, saw mandrel, and "constant centered" drive.

★ ★ ★

EARTHMOVING CONTRACTOR — **Caterpillar Tractor Co.,** Peoria 8, Ill. (16 pp., illustrated) Entitled "There's Work to Be Done," booklet illustrates numerous jobs previously done by earthmoving contractor and gives indication of big job that lies ahead in post-war period.

SINCLAIR MATCHED LUBRICANTS

for Top Operating Efficiency



MATCHED EFFICIENCY of lubricants obviously should help to assure top operating performance. Coordinating quality motor oil with similar high grade gear lubricant, chassis and wheel-bearing greases for *equalized* lubricating efficiency is practical with Sinclair specialized automotive lubricants.

SINCLAIR OPALINE* MOTOR OIL offers positive engine lubrication, free acting rings, resistance to carbon deposit and crankcase accumulations, avoidance of bearing corrosion . . . OPALINE GEAR LUBRICANT provides extreme pressure lubricating protection to prevent galling and scuffing, resists oxidation under operating temperatures, and is free flowing under Winter conditions . . . OPALINE CHASSIS LUBRICANT has "staying" properties and built-in extreme pressure characteristics . . . and for wheel bearings SINCOLUBE is designed to meet service temperature and pressure requirements, also keep an adequate lubricating film on balls and rollers, with freedom from leakage to brake linings and hubs.

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Try these matched lubricants for top operating efficiency and economy.

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SINCLAIR LUBRICANTS—FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Nitro Starch Base

HIGH EXPLOSIVE EFFICIENCY

IN MINING · QUARRYING · LOGGING · CONSTRUCTION

Plus THREE ADVANTAGES FOR YOU!

1 WILL NOT PRODUCE HEADACHES from handling . . . reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!

2 WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency . . . anywhere . . . anytime!

3 WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!

EXPLOSIVES 1905 TROJAN 1945 CHEMICALS

● Your men will give a hearty "O. K." to Trojan, the explosive that does not produce headaches from handling. And you will be equally enthusiastic because Trojan reduces the discomfort from breathing muckpile fumes—creates better working conditions for the workers—improves the efficiency of all who actually handle explosives or work in the area where explosives are used.

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One of America's Oldest High Explosives Manufacturers

PLANTS: SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION

OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

INDUSTRIAL SAFETY EQUIPMENT—**Stewart R. Browne Mfg. Co., Inc.,** 258 Broadway, New York 7, N. Y. (24 pp., illustrated) Pictures and describes portable tuffite flashlights, battery-operated inspection lights, vapor-proof and explosion-proof portable extension lights, aircraft engine inspection lights, and emergency grounding devices. Includes price information for all products.

* * *

Caisson Underpinning

(Continued from page 80)

care with which the work was conducted.

The design called for a 5-ft. circular caisson to be sunk under the riverward wall of each cell in the front row. In brief, the construction procedure was to drive an in-

(Continued on page 150)

QUICK RECONDITIONING OF STEEL PARTS USED IN CONCRETE WORK

Screed hooks, forming pallets, clamps and similar steel parts that have been sent to the sidelines because of heavy rust, concrete or paint deposits can now be reclaimed by simple mass tank immersion in recommended solution of Oakite Compound No. 32. This controllable acidic-type cleaning compound removes heavy scale, rust and concrete accumulations. Hose rinsing and neutralizing quickly restore parts to excellent condition for continuous useful service.

Your local Oakite Technical Service Representative will gladly show you how you can install this economy measure in your construction work. Or write us direct for complete installation instructions. No obligation.

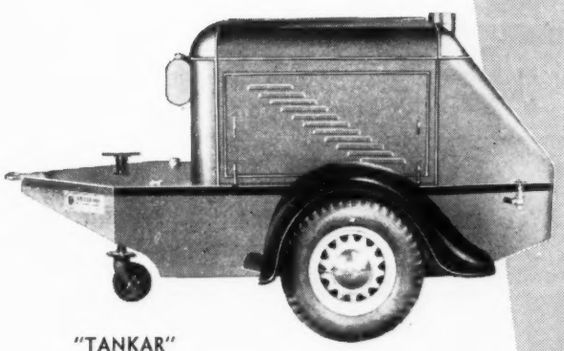
OAKITE PRODUCTS, INC.
24G Thames Street, New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* CLEANING
MATERIALS · METHODS · SERVICE FOR EVERY CLEANING REQUIREMENT

ROAD CONSTRUCTION AND MAINTENANCE EQUIPMENT

"SPRAY MASTER"

PRESSURE DISTRIBUTOR



"TANKAR" STEAM HEATER

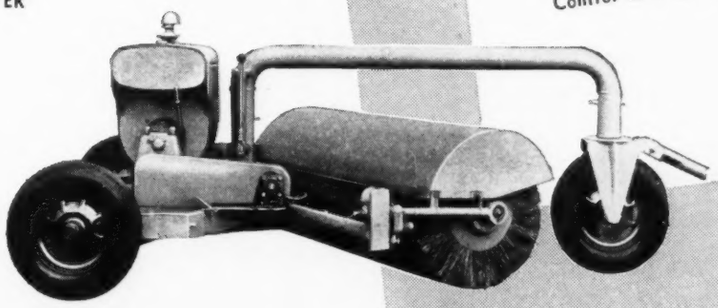
Here is the Construction and Maintenance Equipment you have been waiting for—designed by engineers skilled and experienced in Black Top Construction and Maintenance requirements.

"Spray Master" Pressure Distributor has but one valve for operating the spray—has as standard equipment numerous features called extras on similar units.

"Tankar" Steam Heater is the fastest steam producing unit made today for unloading Tank Cars of Asphalt, etc.

Model No. 108 Power Driven Road Broom is a two-way broom capable of sweeping in either direction. Hydraulic Tention Control is a Littleford Feature.

MODEL NO. 108 POWER DRIVEN ROAD BROOM



LITTLEFORD

BLACK TOP ROAD MAINTENANCE EQUIPMENT · LB · SINCE · 1900

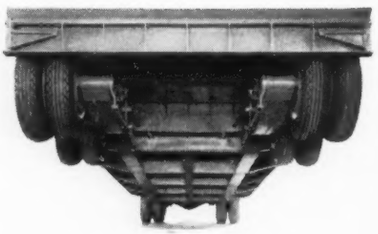
LITTLEFORD BROS., Inc.

465 E. PEARL ST., CINCINNATI 2, OHIO

A ROCKING BEAM Trailer?

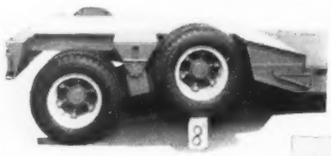
YES HERE IT IS!

ROGERS also builds trailers for unusual needs, embodying characteristic features of fundamental design but modified to meet the special requirements. *For example, consider the above illustrated*



ROGERS TRAILER

This is the new Model T trailer which has two rocking, box-girder sections at each end of which is a spindle, carrying a wheel and two extra large tires. This design gives the desired oscillation and permits building trailers only 8 feet wide in capacities up to 35 tons. This two axle trailer meets the needs existing in some states that limit the tonnage that can be carried on one axle.



Write for information on standard or special trailers which have been tested in difficult service.

ROGERS

EXPERIENCE .... *builds 'em*

PERFORMANCE .... *sells 'em*

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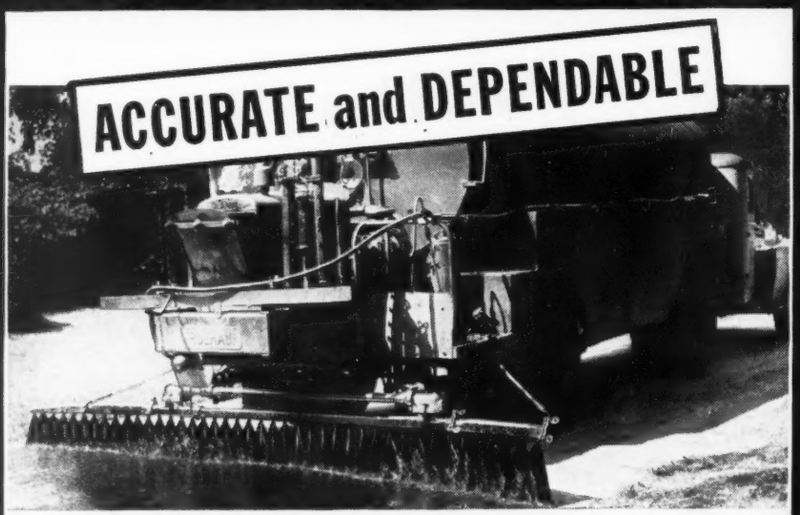
220 ORCHARD ST. ALBION, PA.

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

ACCURATE and DEPENDABLE



For over 40 years—constant research, faithful attention to engineering detail, quality construction methods and materials—all assure you of efficient, economical operation with Etnyre "Black-Topper". Get details—see your Etnyre dealer or write us.

E. D. ETNYRE & CO., Oregon, Illinois

(Continued from page 150)

dividual cofferdam for each caisson, pump it dry, break a hole through the slab and the lower part of the cell wall, pull the piles within the caisson area, jack pipe sections as the caisson walls down through the sand to a seal in the blue clay, and then continue to rock by the Chicago Well method of wood lagging held by inside steel rings. The caisson was then filled with concrete to within 5 ft. of underside of slab, encasing a steel grillage at that level to support the lower part of the steel rocker. The upper part of the rocker supports a grillage of longer beams placed against the underside of the slab, packed with dry grout as a firm bearing against the slab. Filling in the holes in the slab and cell wall completed the work, after which the cofferdam sheeting was pulled. This same procedure was successively followed for each caisson.

Preliminary Work

The first construction step was to drive a 14-ft.-wide cofferdam of 16-ft. steel sheeting, extending 4 ft. out from the edge of the slab. The side walls of the cofferdam were tied in with the cell wall by shorter sheeting driven to the top of slab. Then the area within the sheeting was excavated to bottom of the mat on the outside of the slab and to the top of the slab. Two 8-in. self-priming centrifugal pumps pulled and kept the water level well below the bottom of slab. One pump was set in an extra sump outside the cofferdam area; the other was moved ahead from one cofferdam to the next as work progressed. At first it was thought that wellpoints could take care of the drainage, but broken rock, pile heads and other debris permitted too large a flow of water under the slab so the wellpoints were rejected in favor of the greater capacity of the sumps. A third 8-in. pump was held in reserve.

After the water had been pumped down below bottom of slab a section of the cell wall 5½ ft. wide and 6½ ft. high was removed and a hole was broken through the foundation slab for the caisson.

The next step was to pull the old foundation piles within and adjacent to the caisson area. Not only were the piles within the caisson area pulled, but also all surrounding piles suspected of deviating from the vertical and thus coming within the caisson area further down. Pile pull-

(Continued on page 152)

There's an OSGOOD that will do it...

FASTER • BETTER • MORE ECONOMICALLY!

Today thousands of state, county, municipal and private postwar projects are waiting for the "green light." Thousands more are still being planned. Tomorrow all these projects will be underway . . . the greatest construction boom in the country's history, embracing every type and variety of construction work. And those who plan wisely will have **OSGOOD** equipment on these jobs, large and small.

Completing a century of service to the construction, excavating and materials handling fields, **OSGOOD** offers the most complete and advanced line of equipment in its history. Power shovels, cranes, draglines, backhoes, pile-drivers . . . crawler and pneumatic-tired mountings . . . diesel, gas or electric drive . . . embodying every advancement in design, construction and operation, including the famous **OSGOOD** Air Control and the new **OSGOOD** "Cushion" Clutch. See your nearest distributor, or write direct! It will pay you to know what **OSGOOD** can do for you!

To Help YOU Select Your OSGOOD

Type 5	⅜ cu. yard
Type 20	½ cu. yard
Type 50	1 cu. yard
Type 70	1¼ cu. yard
Type 80	1½ cu. yard
Type 80	1¾ cu. yard
Type 91	2 cu. yard
Type 100	2½ cu. yard

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD — CRANES-SHOVELS — MARION OHIO U.S.A. — OSGOOD GENERAL

THE OSGOOD COMPANY • MARION, OHIO

ARMY-NAVY E

OSGOOD
SHOVELS, DRAGLINES
CRANES

JACKSON
ELECTRIC VIBRATORY HAND SCREED

Brand New and What a Honey!

The new JACKSON revises all previous ideas of what constitutes a thoroughly convenient, highly efficient hand screed. There is nothing in screed history that begins to approach it. Listen to this:

ONE MAN OPERATES IT WITH EASE

The position in which the vibratory motor is mounted tends to make the entire screed ***self-propelled!***

SECOND PASSES — *Easily, Quickly Made*

by simply lifting the handle and rolling the machine back as far as necessary. No other screed has this feature.

GETS RIGHT UP TO THE WALLS

Nothing protrudes beyond the end of the screed. Hence it may be operated practically ***against the wall.*** With no other screed, to our knowledge, can you do that.

VARIABLE FREQUENCY CONTROL TO SUIT CONSISTENCY OF ANY MIX

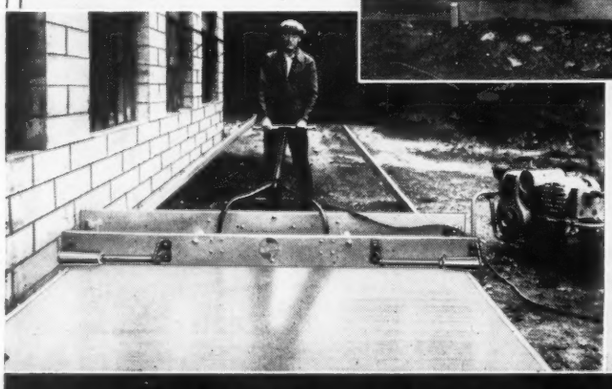
by instant adjustment of power plant engine throttle. Thus plenty of energy may be had for thoroughly puddling stiffest mixes throughout the section; vibrations reduced for second passes.

INSTANTLY ADJUSTABLE ROLLERS

to vary screed length over 4 ft. range. Screed planks quickly renewed. Available in any practical length.

A NEW HIGH IN DEPENDABLE PORTABLE POWER

is now available in the JACKSON postwar Power Plants. These have permanent magnet generators in which all usual maintenance, other than lubrication, is eliminated. Especially designed for severest service under continuous operating conditions. Simple, rugged construction and design, stripped of fussy control gadgets. Operate all Jackson Vibrators. Ideal for lights, and all types of contractors' power tools. 1 to 7.5 KVA sizes available. Get the facts on this time and money saving equipment! Write, NOW.



Above—Tilted to make a second pass.

Left — Forward movement requires little more than guidance on part of operator.

ELECTRIC TAMPER & EQUIPMENT CO. LUDINGTON MICHIGAN

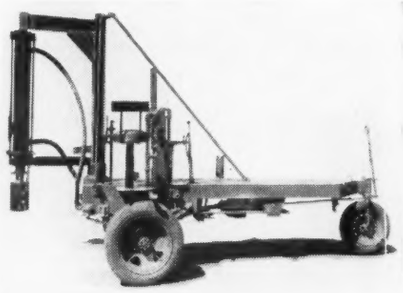
(Continued from page 150)

ing was done by two 50-ton Buda jacks placed on top of the slab on opposite sides of the caisson hole and under each end of a steel beam spanning the opening. A 1½-in. cable thrown over the beam, the cable ends being wrapped around a pile, formed the pulling sling. An average of 11 piles were pulled under each caisson area. Because of limited headroom, the piles had to be cut into 8-ft. lengths as they were withdrawn. Piles that required removal from under the slab were jacked laterally to draw them in position to be extracted through the caisson hole. As each pile was pulled its hole was backfilled with sand to minimize loss of friction on adjacent piling.

Caisson Sinking

After all piles had been removed the next step was to obtain a water cutoff in the clay 40 ft. below water level. For this purpose sections of 5/16-in. steel shell, 5 ft. 4 in. in diameter and 6 ft. long with a 4-in. band welded inside to form a sleeve

(Continued on page 154)



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RAPID PAVEMENT CONCRETE BREAKER

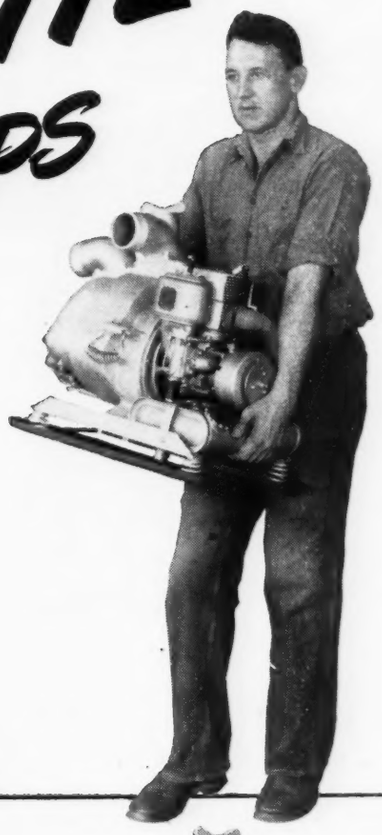
Fastest Pneumatic Method
Cuts Cost and Time
Works Inside or Out
Vertical or Horizontal
Good for all Small Jobs

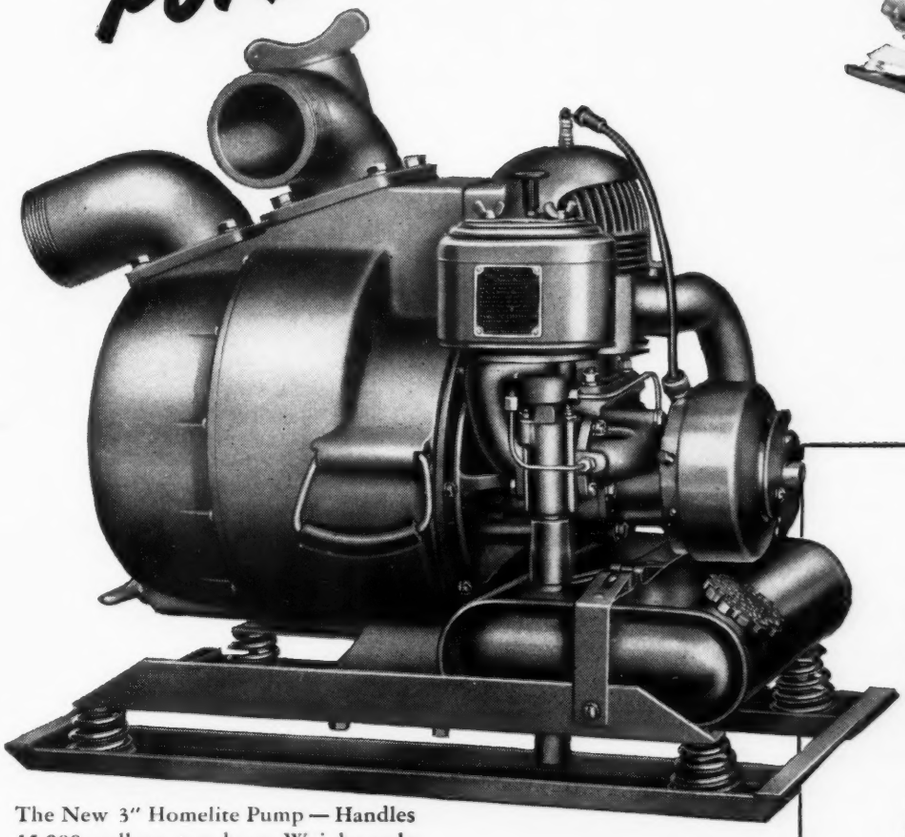
Ask about our

HEAVY-DUTY TYPE

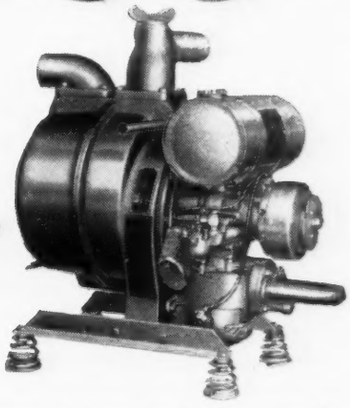
RAPID PAVEMENT BREAKER COMPANY
1517 Santa Fe Ave. Los Angeles 21, Calif.

Announcing... The New HOMELITE PORTABLE PUMPS

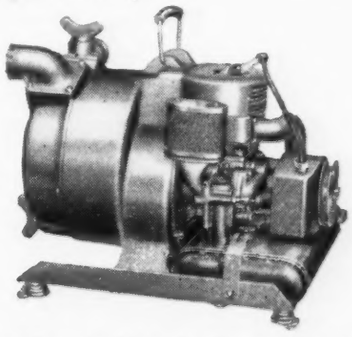




The New 3" Homelite Pump — Handles 15,000 gallons per hour. Weighs only 95 pounds complete.



The new 2" Homelite Pump — Handles 10,000 gallons per hour. Weighs only 88 pounds complete.



The New 1½" Homelite Pump—Handles 3,500 gallons per hour. Weighs only 48 pounds complete.

- **FASTER PRIMING**
- **FASTER PUMPING**
- **COMPLETELY PORTABLE**
- **BUILT-IN GASOLINE ENGINE**

Send for New Homelite Bulletin

HOMELITE

Portable **CORPORATION**

PUMPS • GENERATORS • BLOWERS

PORT CHESTER, NEW YORK, U.S.A.

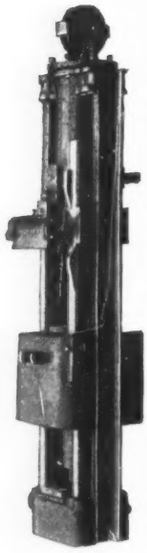
Right on the
BUTTON

It takes positive punching to put down a fighter . . . or a PILE

WARRINGTON-VULCAN

Single-Acting Steam

PILE HAMMERS



You win decisive decisions over stubborn piles by using the rugged strength and positive action of Warrington - Vulcan Single - Acting Steam Pile Hammers.

Operating at a medium steam pressure, they deliver a moderate frequency of telling, low velocity blows from a relatively heavy ram and drive any kind of pile—wood, steel or concrete. Their simple design, with all working parts exposed for accessibility, produces operational efficiency. Their ruggedness saves maintenance and mechanical costs; their unvarying performance saves operating expense. They've been proved in action since 1887.

Write for full details on this powerful pile driver that slams 'em right on the button—every time.

VULCAN IRON WORKS Since 1852

331 North Bell Avenue

Chicago 12 ---Illinois

(Continued from page 152)

joint, were jacked down through the sand into the clay. As each section was jacked down the joints were welded watertight. The jacking was done through a system of yokes. Two 2-in. rods were set vertically through holes drilled through the slab, fastened at bottom side of slab with 12x12-in. plate washers. At the top end of the yoke system 12x12-in. washers were placed above a pair of cross-beams extending over the shell. Girder beams placed across top of shell and jacks bearing against the yoke system forced the shell downward.

During jacking operations the excavation was carried below bottom of shell to minimize friction. This method was used until the steel shells were embedded 5 ft. into the clay, thus forming an effective water ing was required during the excavation below bottom of shell. Excavated material was hoisted to the surface in small buckets by an electric caisson hoist. The caissons were then concreted to the bottom of the lower grillage.

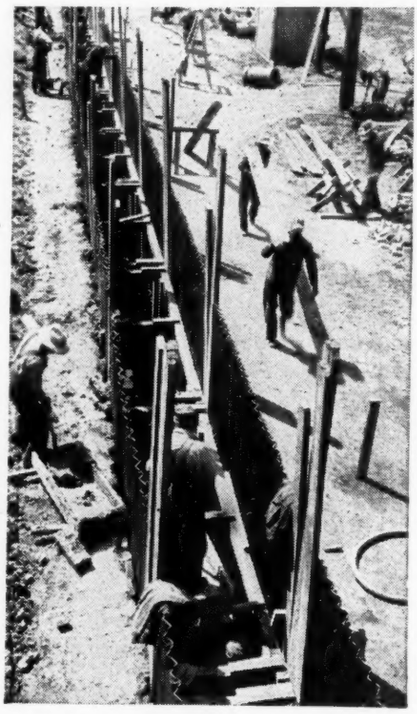
The steel shells, during excavation operations, were left well above top of slab level to protect the workmen in the hole in case of a pump failure. Upon completion of excavation these shells were burned off at lower grillage level.

Top grillage beams, 12 ft. long, were juggled through the hole in the slab after the two sections of rocker had been set. Then both the upper and lower sets of grillage were encased in concrete, the upper beam being packed with dry grout for a firm bearing against bottom of slab. To permit free movement of the rocker the rocker assembly was packed with clay.

Difficulties Encountered

In general, the scheme worked very well, but trouble was encountered from crooked piles, pile heads, large stone and debris encountered down to 10 ft. below bottom of slab. This debris consisted of large stones, an old dynamo, a cast iron stove, a 4 in. shaft with large spider gears, all of which permitted a heavy flow of water besides being difficult to remove. Also several crooked piles were encountered at the leading edge of the shell, which had to be cut under extreme difficulty. This necessitated installation of a separate 3 in. electric centrifugal caisson pump to keep the shell dry while the piles could be cut off.

JOBS GO FASTER..
with steel sheeting



In many cases, ARMCO Sheeting can be driven the full depth before excavating.

Let's see how ARMCO Sheeting does it—

This sturdy, light-weight sheeting goes in fast and easily because of its smooth surface and small displacement. It can readily be pulled and used over and over again, thus saving time and materials.

Another important advantage of ARMCO Sheeting is that you can order in the exact gage and type you need. The interlocking type, used where watertightness is desired, has a covering width of 14 inches and comes in 12 to 7 gage. The flange type, commonly used in sheeting trenches, is 12 inches wide and comes in 12 gage and heavier. Standard lengths of both types run from 6 to 20 feet or more. Write for complete information. Armco Drainage & Metal Products, Inc., and Associated Companies, 105 Curtis St., Middletown, Ohio.

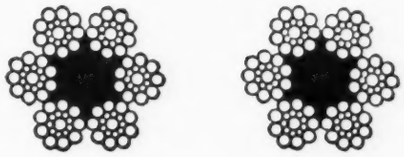
★ ARMCO ★

ARMCO SHEETING

RUBIES

Two rubies, one real, the other synthetic, may look alike, yet differ in value.

and



ROPES

Two pieces of wire rope may be of identical construction yet differ in performance.

The purchaser of wire rope isn't buying wire rope, but the service that rope will render on the job. And wire rope performance is dependent not alone on its "construction" but upon the quality of the wire used in its manufacture.

Back of the long service which Wickwire Spencer Wire Rope renders is 125 years of experience. The steel is made in our own open hearth furnaces. This type of refining furnace removes all but absolute minimum quantities of harmful phosphorus and sulphur. It also permits blending of proper proportions of carbon and manganese to produce rope wire that meets exacting specifications. Only the heart of the steel ingot is used for rope wire. This is carefully rolled, drawn and processed to produce wire with the highest possible degree of hardness, strength, toughness and fatigue-resisting properties.

Every wire is drawn until it is accurate within a fraction of a thousandth of an inch . . . an important fact to remember since the performance and durability of wire rope is dependent upon accurate coordination of each component part.

Even though wire rope is tough, it is a delicate mechanism and as such is deserving of care to insure longer service. To help you get such service we have available an 82 page book packed with useful ideas for lengthening rope life. It's yours for the asking. And, if you have any problems regarding wire rope our engineers will be happy to help in their solution.

WICKWIRE SPENCER WIRE ROPE . . . IN ALL CONSTRUCTIONS FOR EVERY NEED

WICKWIRE SPENCER Steel

A DIVISION OF THE COLORADO FUEL AND IRON CORPORATION
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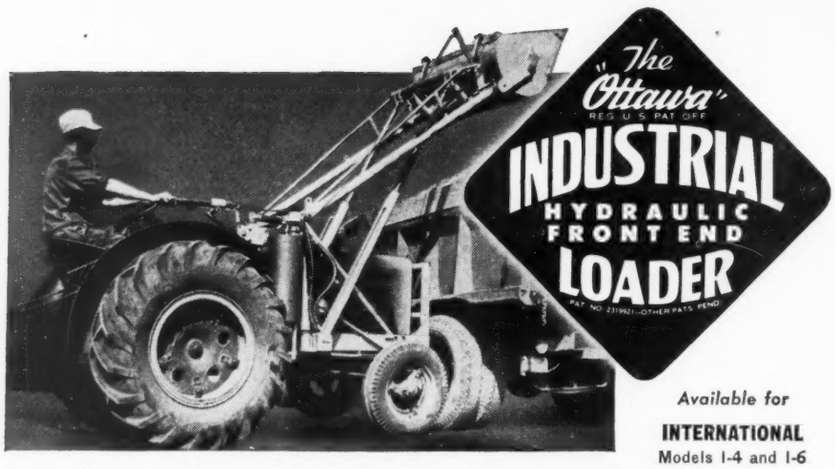

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INTERNATIONAL
Models I-4 and I-6

ALLIS-CHALMERS
"WC" with wide front wheels

OLIVER
"70" Industrial

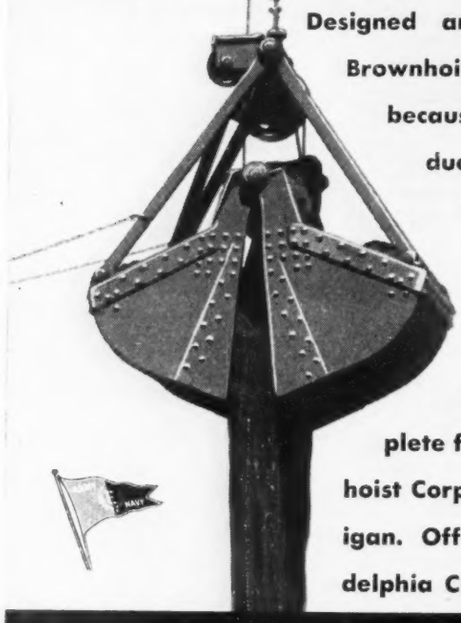
MINNEAPOLIS-MOLINE
"RTI" and "UTI"

Lifts 3,000 Pound Load 8 Feet

The "Ottawa" INDUSTRIAL Hydraulic Front-End LOADER is a HEAVY DUTY Machine . . . it lifts 3000 pounds of Sand, Gravel, Rock, Coal, Steel Pipe, Dirt or Other Bulk Materials to a height of 8 feet quickly and easily . . . it assures operator perfectly CLEAR VISION at all times, is quickly and simply ATTACHED or DETACHED and is SHIPPED COMPLETE (there's absolutely nothing additional to buy or add) with complete HYDRAULIC SYSTEM including pump and valve. Bulldozer blade, Snowplow and Boom attachments are available. Write or wire today for FREE ILLUSTRATED FOLDER and prices. Immediate shipment.

Ottawa STEEL PRODUCTS, Inc.
OTTAWA 31, KANSAS

BROWNHOIST BUCKETS



Designed and built by Industrial Brownhoist Corp. do a better job because, 1) Large Sheaves reduce rope wear, 2) Heavy Carbon - Steel digging lips take deep, clean bites, 3) Extra-sturdy construction insures long life. Write for complete facts to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York, Philadelphia Cleveland and Chicago.

BROWNHOIST BUILDS BETTER BUCKETS

CONCRETE ARCH ROOF

(Continued from page 95)

the first layer. Each lap is fully mopped so that felt does not touch felt. Each sheet is nailed to the Wolmanized nailing strip with ¾-in. zinc-coated barbed roofing nails spaced about 9 in. on centers and driven through zinc-coated metal disks.

Where the roof has a slope of 6 in. or more to the foot, the supply of insulating board is primed with asphalt and allowed to dry. A ⅛-in. coating of plastic cement is spread uniformly over this area and three sheets of felt are laid successively with 22-in. laps and coated uniformly with plastic cement ⅛ in. thick between each sheet. Sheets line with and are nailed in the same way as roofing for the other portions of the roof. The original design called for an overlap of 12 in. where the mopped-on, built-up roofiing and the troweled plastic and felt roofing met; inasmuch as this double thickness of roofing would be evident, an alternate method of application was devised. Each ply of the hot-mopped, built-up roofing felts was mopped in placed down to the point where plastic was installed and from that point the same ply of felt was applied in plastic cement.

Artificial Rib

An artificial rib effect is created by sheathing expansion joints with Wolmanized lumber. Treated sheathing, fastened to construction joints and arch ridge by imbedded bolts, is covered with roofing felt and 16-oz. copper flashing secured by 1½-in. copper cleats. All roofing and metal flashing is given an aluminum paint finish.

Upon completion of insulating and roofing of the 1,800-ft. extension, the original structure will be insulated and roofed in the same way. When finished, built-up roofing will have been applied to 4,200 roofing squares or 420,000 sq. ft. of roof, including the 3000-ft.-long basin inclosure and the flat roof of the fitting room.

Because the high degree of ac-

(Continued on page 160)

MORE CONTRACTORS

are switching to Job-Rated trucks

IT WAS no "wartime secret" that owners of Dodge *Job-Rated* trucks experienced consistent "on-the-job" operation. Because their trucks *fit the job*, they performed more efficiently, operated more economically, lasted longer.

That's why today so many more contractors are planning to standardize on precision-built Dodge *Job-Rated* trucks.

They're buying trucks with engines rated for their loads. They're getting trucks with a transmission and clutch, with axles, springs and every other unit *Job-Rated* to handle the job . . . to do a better job, longer, and at low cost!

DODGE DIVISION OF CHRYSLER CORPORATION

LISTEN TO THE MUSIC OF ANDRE KOSTELANETZ, WITH FAMOUS GUEST STARS
THURSDAYS, C. B. S., 9 P. M., E. T.

4

WARTIME YEARS PROVED PLENTY

Two "eye-opening" facts that will long be remembered by men to whom trucks were a "bread and butter" proposition during wartime, are these:

1 There's no substitute for years of truck-building experience, or for precise workmanship and quality . . . major reasons for the economy, dependability and long life of Dodge Job-Rated trucks.

2 Dodge Job-Rated trucks stayed on the job because of the ready availability of Dodge TRUCK PARTS and because of the prompt, efficient truck service of Dodge dealers.

See your Dodge dealer Now! Let him help you choose the right Dodge Job-Rated truck for all your hauling needs!

DODGE *Job-Rated* TRUCKS

FIT THE JOB . . . LAST LONGER

(Continued from page 156)

curacy required for comparative tests of ship models can be obtained only when the carriage which tows the model through the water travels at a uniform speed (varying only 0.01 or 0.02 knots) the 7,500 ft. of rail in the basin building extension will be laid to a 0.002-in. tolerance from the earth's curvature so that gravity does not accelerate or retard the carriage. Only a 0.001-in. vertical deflection of the track structure is allowed. To maintain this extreme accuracy, separate and independent substructures are eliminated and the massive reinforced concrete basin walls supporting the rails rest directly on solid bed rock. Rails, supporting castings, and fastenings are heavy and elaborate.

Lack of funds forced the Navy to shorten the planned length of the original high-speed basin from 1,600 ft. to 1,168 ft. This reduction in length also reduced the maximum towing carriage speeds from approximately 30 knots to 20. Lengthening of the high-speed basin will allow the towing carriage to reach much higher maximum speeds and

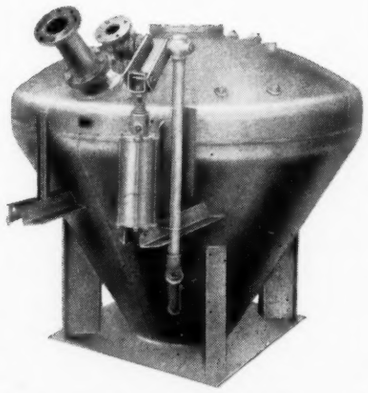
(Continued on page 160)

When
REPUBLIC HOSE
goes on the Job . . . **IT STAYS**

THE BUILT-IN QUALITY of hose by Republic is evident in consistently long service on tough construction jobs. An extra margin of strength and resistance to operational and external abuse is designed for this service. Tube compounds, reinforcements of structures, and cut, tear, and abrasion resistance in covers are primary considerations for Republic technologists and hose builders. Therefore, Republic Hose has the inherent qualities that keep it on the job day in, day out. Consult your Republic Distributor on your requirements.

REPUBLIC RUBBER
DIVISION
LEE RUBBER & TIRE CORPORATION
YOUNGSTOWN 1, OHIO
REPUBLIC INDUSTRIAL PRODUCTS
YOUNGSTOWN, O.
LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.

Move Cement by Air-floating It!



The ROBINSON AIR-ACTIVATED CONVEYOR SYSTEM is practical and efficient, saving in air and maintenance. It has been used on numerous big construction jobs as well as in process plants.

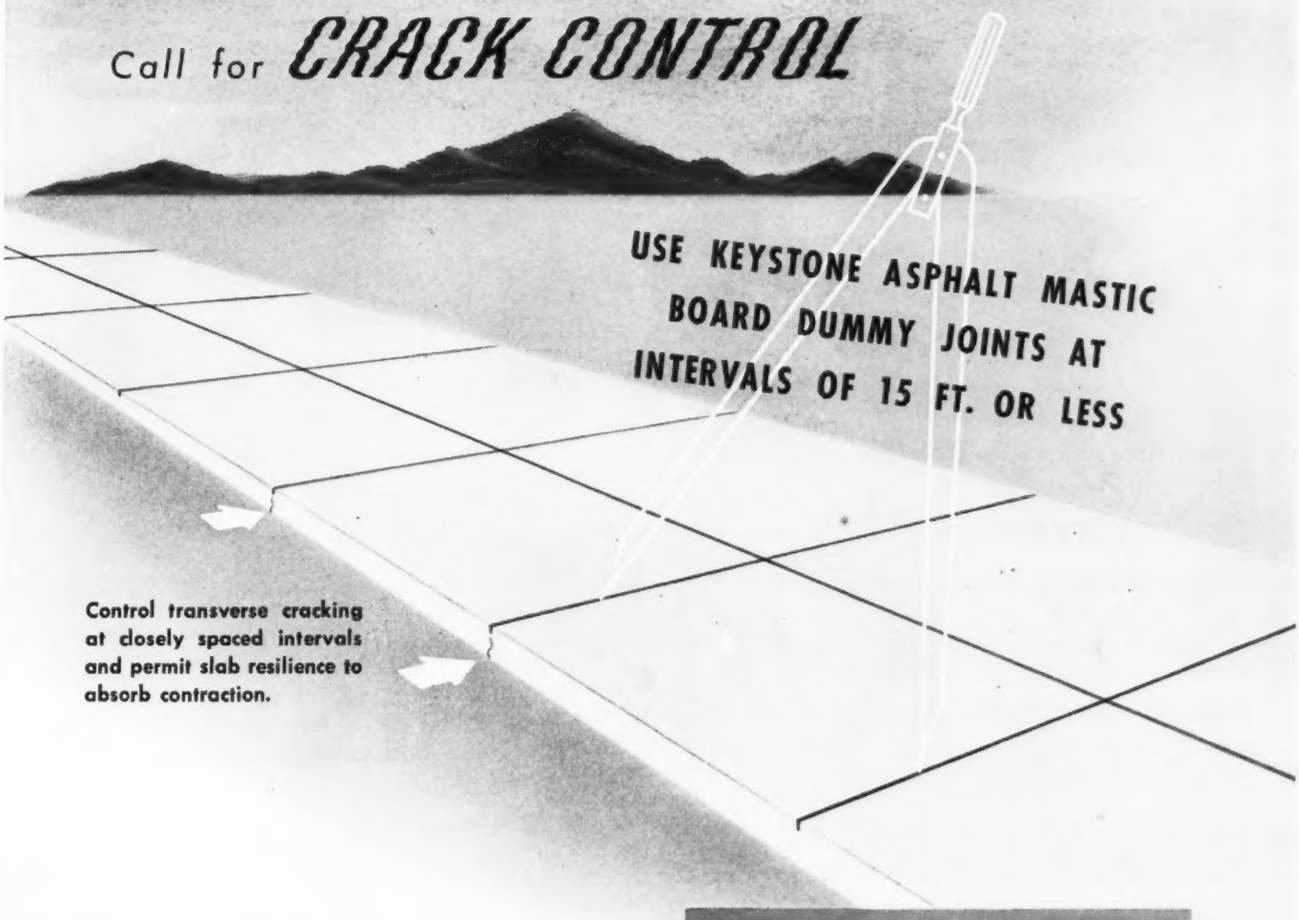
You can order the entire system installed including compressor, piping, storage tanks, etc. or just the activator, such as illustrated, to be used with your own accessory equipment.

Write for illustrated Bulletin No. 310

ROBINSON AIR-ACTIVATED CONVEYOR SYSTEMS
Division of MORSE BOULGER DESTRUCTOR CO.
211-C EAST 42nd STREET, NEW YORK 17, N.Y.
Representatives in all Principal Cities

PROPERLY DESIGNED PAVEMENTS

Call for *CRACK CONTROL*



Control transverse cracking at closely spaced intervals and permit slab resilience to absorb contraction.

KEYSTONE Asphalt Mastic Board Dummy Joints, installed at 15-foot intervals, provide the "crack control" so necessary in pavements. Easily installed without expensive, cumbersome machinery, dummy joints economy makes more practical the close spacing recommended by leading authorities to prevent shrinkage that exceeds the tensile strength of the slabs and causes irregular cracking. The Keystone distributor in your area will furnish complete data and samples.

ONE-SOURCE SERVICE

All paving joints and accessories from just one source for that job that starts on time.

- **Mastic Board Tongue and Groove Joint**
- **Mastic Board Dummy Joint**
- **Fibre and Asphalt Expansion Joints**
- **Asphalt Joint Sealing Compound**
- **Kapco No. 336 Sealing Compound**
- **Kapco Concrete Curing Compound**
- **Subgrade Paper**
- **Sewer Joint Compound**

Keystone's free engineering advisory service is available to you. Write for complete details to Dept. 213.

KEYSTONE ASPHALT PRODUCTS COMPANY

A DIVISION OF AMERICAN-MARIETTA CO.

GENERAL OFFICES: 43 E. OHIO ST., CHICAGO 11, ILL. MFG. PLANT: CHICAGO HEIGHTS, ILL.

POWER PLUS !

100% SELF-CONTAINED

SYNTRON

GASOLINE HAMMER

PAVING BREAKERS

The explosive force of gasoline—driving a free Hammer Piston against the shank of the tool, makes short work of—

BUSTING CONCRETE

CUTTING ASPHALT

DIGGING CLAY AND HARD PAN

TAMPING BACKFILL and numerous other jobs.

Write for free literature.

SYNTRON CO.

500 LEXINGTON HOMER CITY, PA.

NO COMPRESSOR HOSE BATTERY BOX CABLE SPRINGS

That's SYNTRON

(Continued from page 158)

will result in more exact research.

The rectangular basins are constructed in reinforced concrete sections, generally 38 ft. long, separated by 2-ft. construction gaps. After the sections had set and shrunk and the basin inclosure had been completed, these gaps were filled in with reinforced concrete.

★ ★ ★

Atomic Bomb Highway

(Continued from page 83)

and then covering them up to the elevation of the top of the wall.

The contract called for construction under continuous traffic, allowing delays for only short periods of time. Contractors building the Los Alamos community for the personnel on the atomic bomb project caused an almost continuous line of traffic over the road. This traffic had to get through with a minimum of delay. The A. O. Peabody Construction Co. set up crusher at the lower end of the job and the M. M. Sundt Construction Co. was hauling aggregate from the Rio Grande River bed, also at the lower end of the job.

The first heavy blast in the malpais was set off at about 9 p.m. on a Sunday. The blast closed this part of the project completely, with a 50-ft. rock wall on one side and a canyon 150 ft. deep on the other. By early morning it was apparent that it would be some time before traffic could be cleared through. The material from this cut was to be used in a fill below on a short haul, but in order to clear for traffic it was necessary to waste material down into the canyon. This was done with three large bulldozers and one 2-yd. and one 1-yd. power shovels.

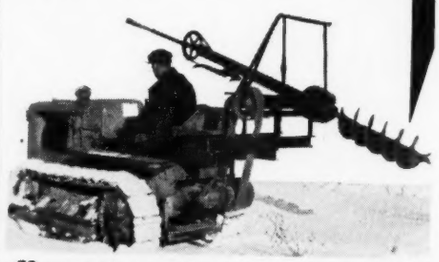
Slides Develop

Under constant blasting and heavy traffic along this 1,000 ft. side-hill cut, a shoulder slide developed that cut back into the roadway. It was first thought this could be arched but it was finally decided to move the line 10 ft. farther into the face of the cliff. As this section was on a series of reverse curves, with short connecting tangents, it was

(Continued on page 162)

Digs 600 Holes a Day

For Foundation Footings . . . Highway and Industrial Fencing . . . Rural Telephone and Light Poles . . . Airports . . . Cemeteries . . . Holes for Dynamiting, etc.



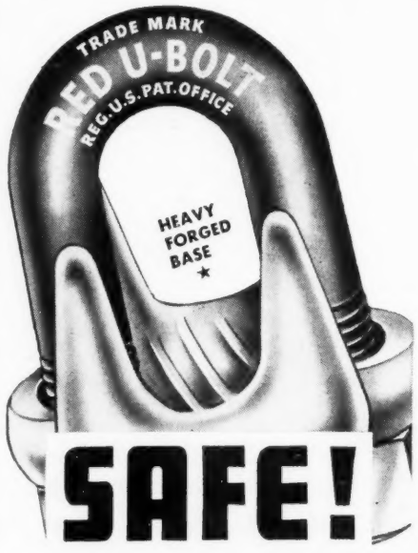
"SPEEDIGGER"

Quickly mounts on all row crop tractors; also available for all crawler-type tractors. Drills at any angle, up to 54" deep. Standard auger sizes from 4" to 12".

Operator stands on platform, behind protective handrail . . . out of dirt . . . away from moving parts. Built extra strong for toughest digging operations. Drills through hard dirt, frosted ground, roots and gravelly soils. Thousands in use by state highway departments, utility companies, U. S. Govt. engineers, etc. Thoroughly proved. Guaranteed.

WRITE for details and prices . . . available now . . .

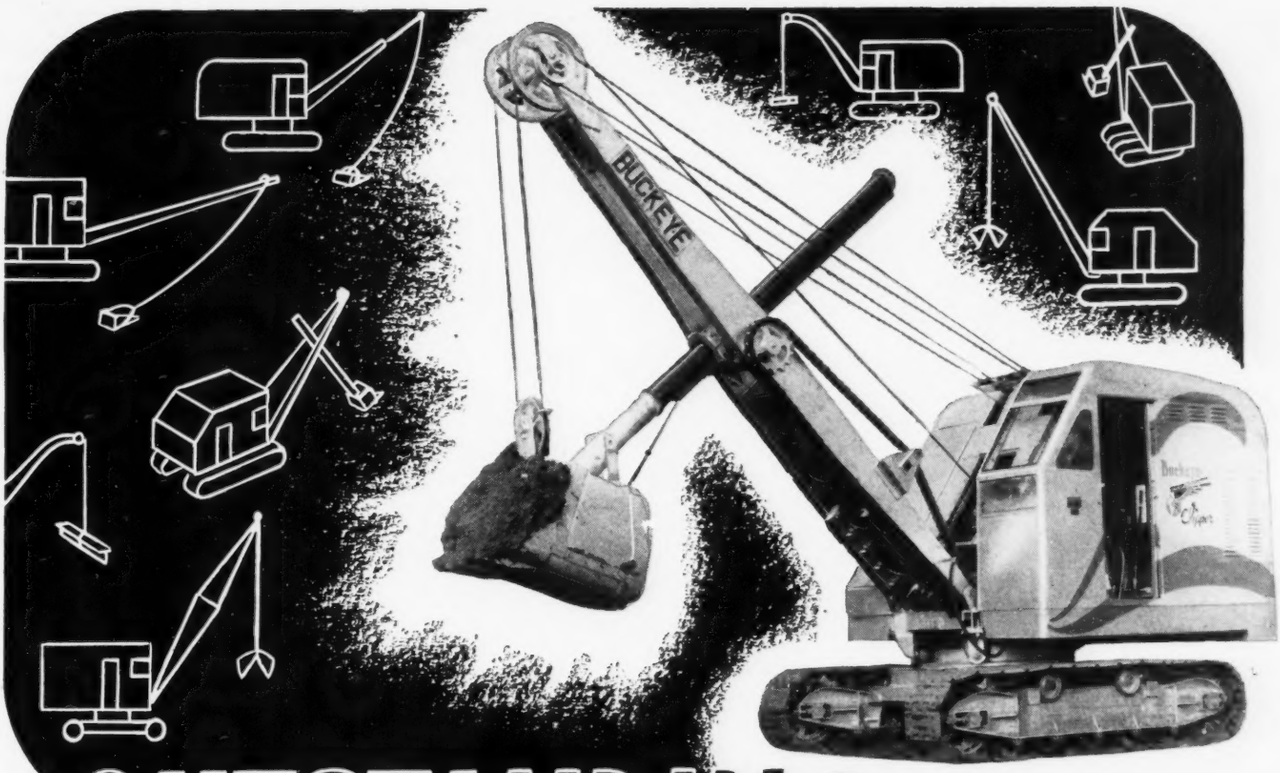
R. J. PIPER MANUFACTURING CO.
PRINCETON, ILLINOIS
New York Office: 100 E. 42nd St.



SAFE!

They won't break even if struck a direct blow by a heavy object . . . because they're forged, *not* cast! Available everywhere. A product of the American Hoist & Derrick Co., St. Paul 1, Minnesota.

CROSBY CLIPS



OUTSTANDING IN ITS CLASS!

Buckeye Clipper ½ and ¾ yard convertible power shovels stand out in any comparison with other shovels of like size. They cut costs, handle smoother, dig faster, last longer.

CHECK THESE BUCKEYE CLIPPER FEATURES...

• "Mevac" Metered Vacuum Power Control, exclusive with Buckeye, gives operator better "feel"—makes brake and clutch linings wear longer—eliminates operator fatigue. • Automatic Swing Brake • 360° Swing • Non-Clogging, Self-Cleaning Crawlers • Automotive Type (Chainless) Drive • Independent, Positive, Chain Crowd • Even Weight Distribution • Crowd, Swing and Hoist While Traveling • Vacuum Power Control Dipper Trip

The Buckeye Clipper's 24 points of superior design and construction, that save time and cut costs, are detailed in "The Age of the Clippers." Send for your copy today and learn how these rugged, easy-to-operate, readily convertible shovels can increase your output and lower costs.

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

BUCKEYE DOZERS
Are A Standout, Too

Buckeye Dozers and Trail-builders are outstanding in their field, too! Ruggedly built to stand severe service, they are noted for fast, smooth operation. They dig in and push bigger pay loads with less tractor effort. See your Buckeye dealer for detailed information.

built by Buckeye

CONVERTIBLE SHOVELS—BULLDOZERS—ROAD WIDENERS
TRENCHERS—MATERIAL SPREADERS—R-B FINEGRADERS

MERCER
"The Name that Carries Weight"
MATERIAL HANDLING EQUIPMENT

TRAILER TRUCKS

T-853 Fifth Wheel
10 Ton

Heavy duty. Steel safety plate deck. (4' x 7'). Pressed on solid rubber tires. Wheels mounted on roller bearings. Eye drawbar and rear coupler. End and side rack sockets. Racks optional. Designed by engineers whose reputation is founded upon doing things right. Literature available. *Inquiries invited.*

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Plant: Clifton, N. J.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

FIRST AND FOREMOST featuring
Welded Steel Construction!
WELLMAN
Williams Type BUCKETS

• The best type of bucket construction is welded rolled steel. Wellman Williams buckets are so built—a pioneering Wellman achievement. You get sturdier buckets, less breakage, better service at lower cost!

Send for Bulletin

THE WELLMAN ENGINEERING CO.
7017 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

(Continued from page 160)

necessary to change three complete curves. On another part of the project a similar slide was encountered, and again the line was moved, a distance of 20 ft. this time. At this point there was no possible detour for the Los Alamos traffic and it was imperative that the road be kept open.

At one point on the project it was necessary to eliminate a series of sharp hairpin curves. In order to do this the line had to follow along a sheer 500-ft. cliff for some distance. In eliminating one curve the line spanned a chasm 109 ft. deep. The material to make the fill at this point was to come from a side-hill cut above. This material was volcanic ash and the preliminary estimates had been based on swell. After placing of this material had been started, however, it was found that a shrinkage of 18 per cent had taken place. No borrow pits were available in this section so the line was changed to swing in closer to the face of the cliff. The material at this point was hauled and dumped at the top and pushed over with bulldozers. One dozer went over the 109-ft. fill but no damage was done, only the motor stopping. It had followed the slope all the way down.

Compaction at the bottom of the fill was secured by leveling with bulldozers and then using sheepsfoot rollers. Water was piped down from storage tanks above, using hoses for spraying.

Retaining Wall Built

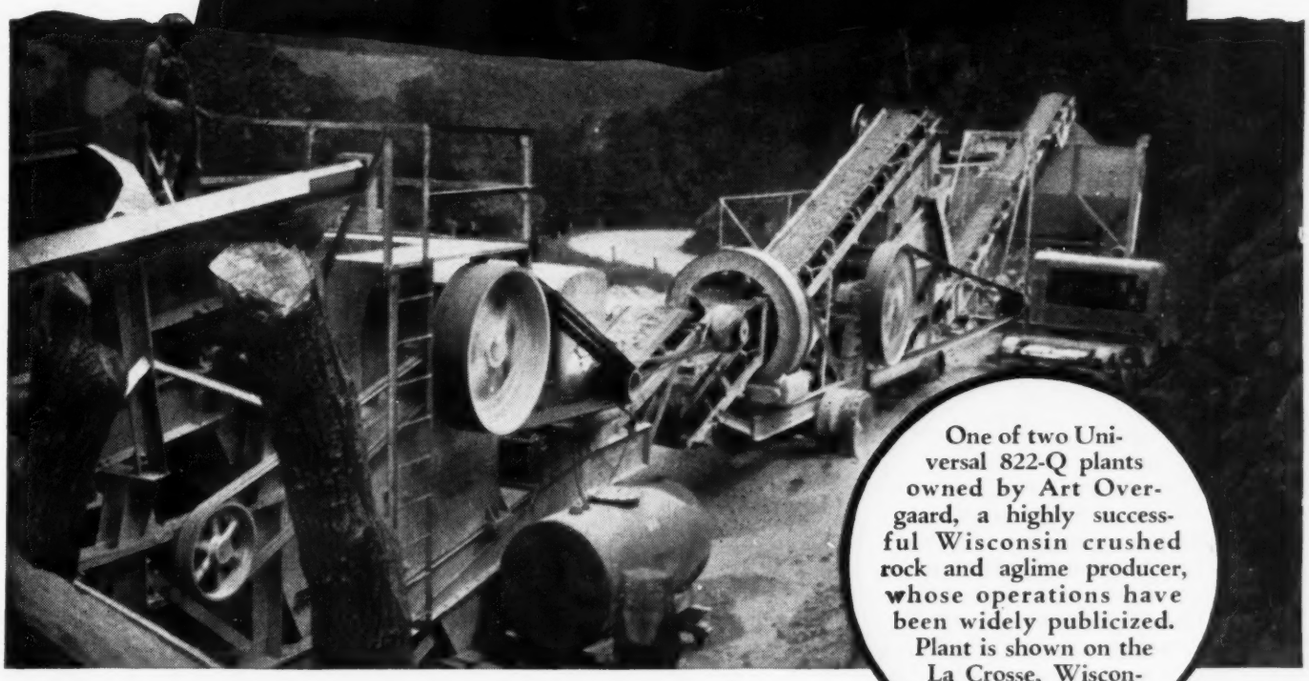
A cut of about 70 ft. was called for on the plans at the point where the side-hill cut comes to the top. At this point it was some 500 ft. to the pine trees below. It was impossible to catch a slope and plans called for hand-placed rock embankment. This was found to be unsatisfactory and rubble masonry retaining walls were used instead, the upper exposed part being mortar rubble masonry. Fortunately the old road with its hairpin curves was used by the traffic along this section.

Seventy-five single and double pipe culverts were used to drain the project and hundreds of boulder car stops were placed for guard rails.

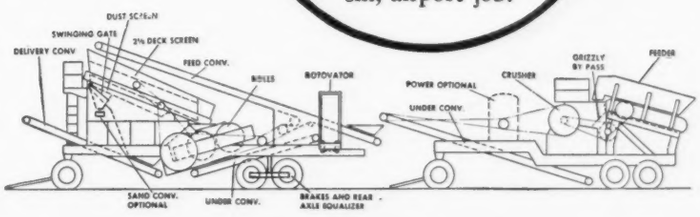
When the contractor, Lowdermilk Brothers, of Denver, Colorado, finished the road it was found that there was 0.7 of a mile of 8-per cent grade and a like amount of 7-per cent besides numerous 5-per cent grades. A curve of 18 deg. also could

(Continued on page 164)

822-Q = { PORTABILITY + HIGH PRODUCTION



One of two Universal 822-Q plants owned by Art Overgaard, a highly successful Wisconsin crushed rock and aglime producer, whose operations have been widely publicized. Plant is shown on the La Crosse, Wisconsin, airport job.



PRIMARY UNIT SECONDARY UNIT

Typical of the many profit-proved Universal portable crushing plants, is the 822-Q crushing, screening and loading plant. Primary reduction is by a Universal 546-P Unit which consists of rugged, steel plate hopper with built-in apron feeder, bar grizzly and by-pass, jaw crusher and underconveyor. Maximum capacity and minimum jaw wear is assured, as material not requiring crushing is short circuited.

Screening and secondary reduction is by the Universal 800 Secondary Unit. Material is fed to the 2½ deck gyrating screen, where larger oversize is scalped direct to rolls from top deck, protecting lower decks from excessive wear and assuring maximum screening efficiency. Material retained on lower deck also goes to rolls—throughs, to mixing hopper and delivery conveyor—dust is rejected by ½ deck. Material from roll crusher is returned to screen via Rotovator, closing circuit. A double deck auxiliary gyrating screen may be set in oversize Rotovator for production of 100% chips for seal coating, if desired.

The Universal 822-Q Crushing and Screening Plant combines the high production of dual crusher units with extreme flexibility, in a compact, easy-to-move plant. Either unit can be used independently. The 800 Secondary Unit is adapted to use as a gravel plant.

This is part of the story—read the rest in Bulletin 30.

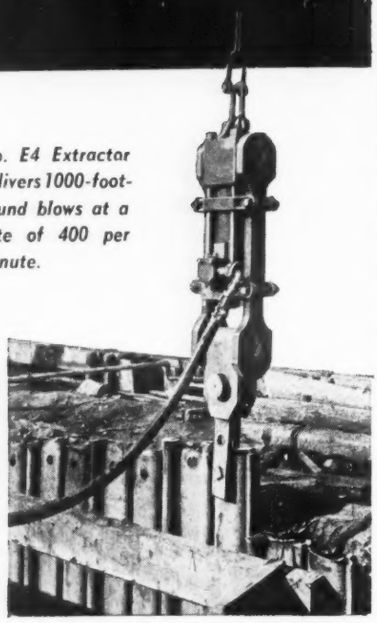
UNIVERSAL ENGINEERING CORP.
327 8th St., West **Cedar Rapids, Iowa**

UNIVERSAL

ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SPREADEROLLERS.

McKiernan-Terry

DOUBLE-ACTING PILE EXTRACTORS



No. E4 Extractor delivers 1000-foot-pound blows at a rate of 400 per minute.

Embodying similar mechanical principles to those of McKiernan-Terry Double-Acting Pile Hammers, these ruggedly built extractors provide exceptional pulling power, with the sharp energy of blow needed to vibrate and loosen stubbornly set piling. Connect with pile quickly, place it just where desired after extraction, disconnect easily. Two standard models—heavy and extra heavy.

WRITE FOR THIS FREE BULLETIN

Full information, specifications, photos, etc. Ask for Bulletin No. 55.

McKIERNAN - TERRY CORPORATION
Manufacturing Engineers
14 Park Row **New York 7, N. Y.**

(Continued from page 162)

not be eliminated. The road rose 1,388 ft. in its 6-mi. length to an elevation of 7,216 ft. above sea level.

The Atomic Bomb Highway construction started Aug. 24, 1943 and the first stage of the work was completed on December 2, 1943 at a cost of $346,990. To make a dustless wearing surface it was necessary to wait for spring so that an oil process surfacing could be placed on it. By July 22, 1944, at an additional cost of $45,000, Brown Bros., of Albuquerque, had finished the construction of the first, and last—we hope—Atomic Bomb Highway. The total cost of that little 6-mi. stretch, including the preliminary engineering, ran around $65,500 a mile. Brown Bros. later built the tower from which the first atomic bomb exploded near Alamogordo, N. M.

The road is a living monument to the atomic bomb and will be traveled by hundreds of tourists visiting the Bandelier National Monument, as 3½ mi. of its length is embraced within the Otowi section of the Bandelier National Monument, under the jurisdiction of the National Park Service.

★ ★ ★

Bituminous Concrete

(Continued from page 103)

ing of the joint when placing the adjoining abutting lower course even though the surface course may have been placed on the first leveling lane. The longitudinal surface joint is designated to be located on the center line of a two-lane pavement so that it will coincide and be hidden to a great extent by subsequent center-line marking. In placing the adjoining course of material the paver is operated so that the bituminous concrete will lap over the edge of the previously placed course 2 or 3 in. The raker then pushes the coarser material away from the joint over on to the newly laid material ahead of the rolling operation which leaves an excess of fines at the joint to form a dense well-bonded joint after rolling.

Some contractors have developed a sort of automatic raking device attached to the paver which is held

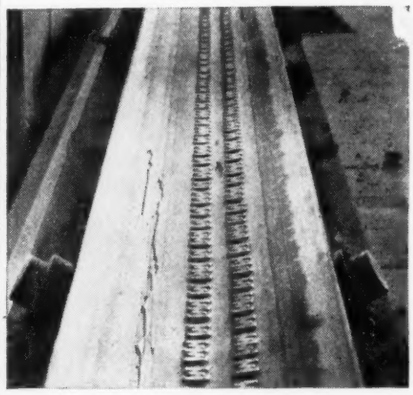
(Continued on page 166)

CONVEYOR BELTS

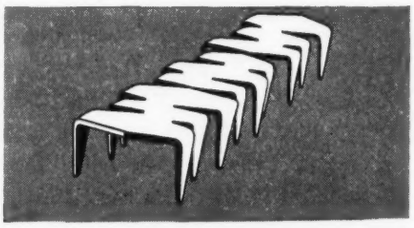
fastened or repaired

ON THE JOB

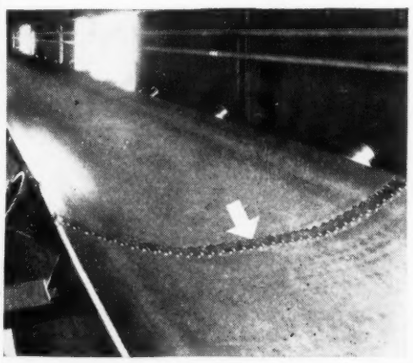
in a few minutes



All you need are hammer, block of wood and . . . .



BRISTOL'S BELT LACING



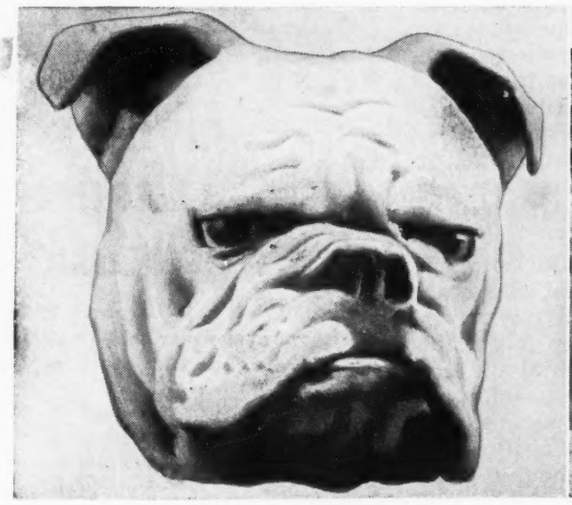
For rubber or woven conveyor belts up to $^{13}/_{16}$" thick.
Write for Bulletin 736.

THE BRISTOL COMPANY
Mill Supply Division
150 Bristol Road, Waterbury 91, Conn.
DISTRIBUTORS EVERYWHERE

The first new blasting development since the war

ATLAS ROCKMASTER

... *less bark with more bite*



THE Atlas Rockmaster is more than a different method of detonation. It's a *whole new system of blasting* —involving new methods of handling, use and loading—achieving results that are almost incredible.

Fragmentation—the "bite" that counts most to superintendents—is amazingly improved. Vibration—the "bark" that caused so many complaints—is greatly reduced. Back Break can be almost entirely eliminated. Any one of these advantages would mark the Rockmaster as an outstanding development. Combined, they make this System one of the really great advancements of the industry.

See your Atlas Representative about the Rockmaster Blasting System. Let him *demonstrate* how it saves time and money. Remember, too, that the Rockmaster gives you

the greater safety of

ATLAS MANASITE DETONATORS

Check these Features

✔ **NOISE AND CONCUSSION** are drastically cut down

✔ **ROCK BREAKAGE** is decidedly more complete

✔ **SECONDARY BLASTING** is reduced to a minimum

✔ **BACK BREAK** can be greatly reduced—more solid footage is assured

Identify the ROCKMASTER by the Blue Color

ATLAS EXPLOSIVES

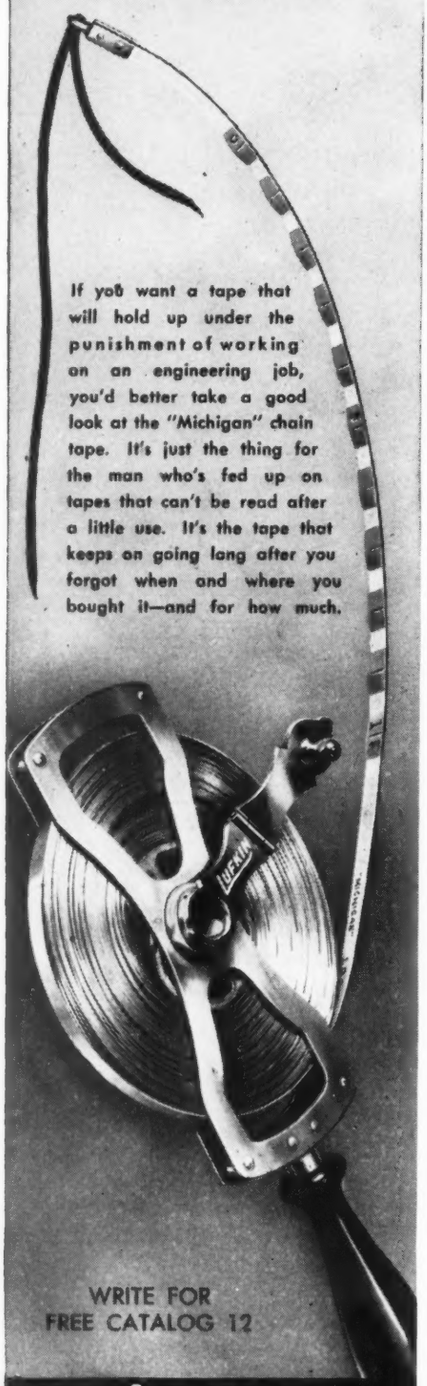
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***

LUFKIN

"MICHIGAN" BABBITT TAPES



If you want a tape that will hold up under the punishment of working on an engineering job, you'd better take a good look at the "Michigan" chain tape. It's just the thing for the man who's fed up on tapes that can't be read after a little use. It's the tape that keeps on going long after you forgot when and where you bought it—and for how much.

WRITE FOR FREE CATALOG 12

LUFKIN

SAGINAW, MICHIGAN • New York City

TAPES RULES PRECISION TOOLS

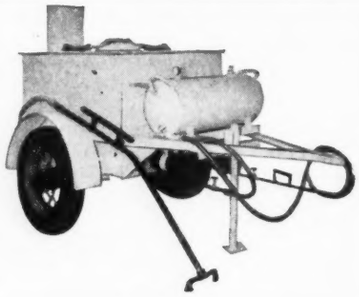
(Continued from page 164)

in contact with the previously placed material with a spring arrangement and which pulls the excess coarse aggregate away from the joint. This device proves very satisfactory in forming at least a part of the work of the raker and giving him an opportunity to improve other sections. We require, if necessary, to obtain a dense joint, that it be heated with torches or a bead of asphalt cement be poured along the bottom of the joint just prior to placing. When air temperatures are low it may be necessary to perform both of these operations in order to obtain a good dense joint. It is well to err on the safe side and have an excess of fines or asphalt cement or both at the joint rather than be deficient, as this will later lead to raveling.

Where sufficient width is available to maintain traffic some contractors have operated two pavers adjoining which makes it possible to lay against hot material and thus essentially not to have a joint.

Some special dolly or screed control attachments have been developed which travel on the previously placed adjoining material to assure

(Continued on page 168)



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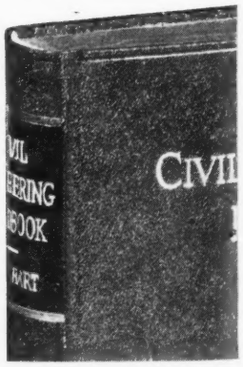

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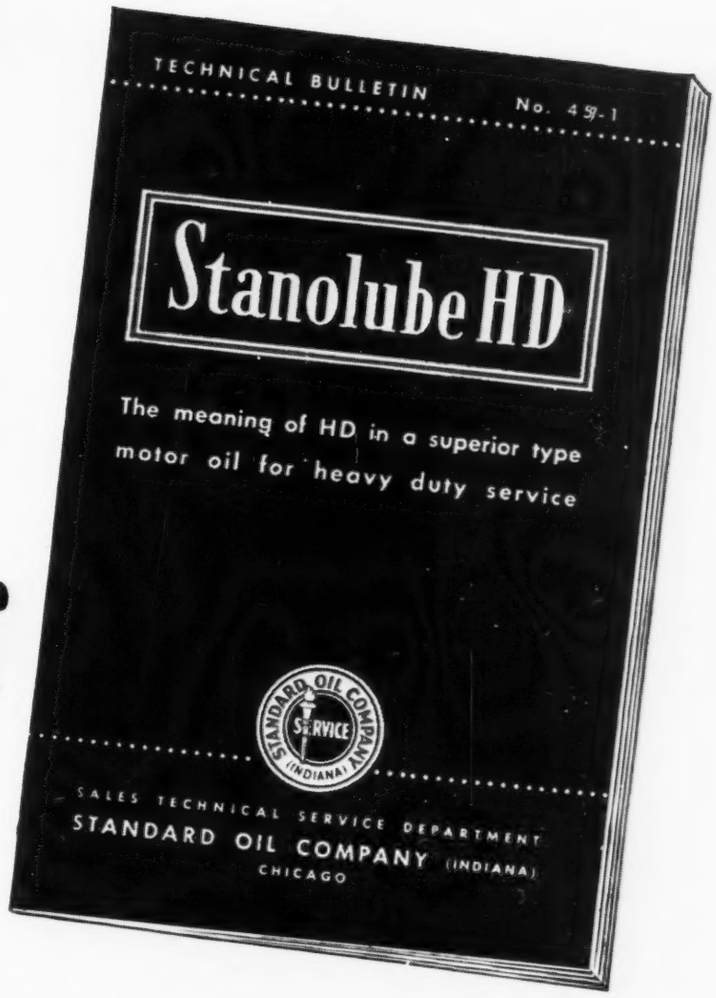
TECHNICAL BULLETIN
No. 45-1
Stanolube HD
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STANDARD OIL COMPANY (INDIANA) SERVICE
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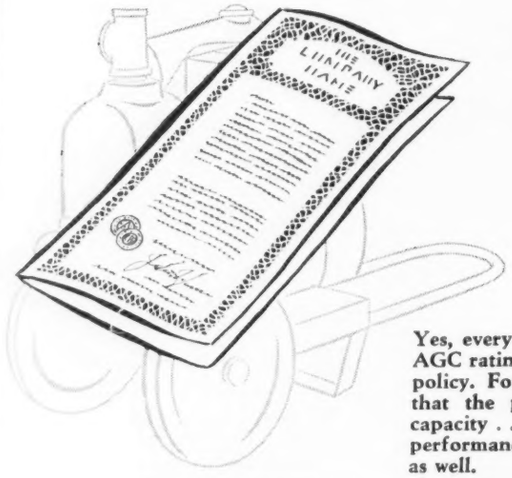

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(Continued from page 166)

that the paver is laying in proper relation to the other lane. These attachments prove very beneficial in assuring that the proper amount of material is deposited to make a good joint. In rolling, the first pass is made with the main portion of the roller operating on the previously placed lane and lapping the joint 4 to 6 in. which increases the density at the joint. The rolling then continues across the newly laid material.

It is desirable to have the leveling course placed to the full width prior to placing any surface course so that it is possible to do any necessary additional leveling to obtain the proper crown. We have specified that surface courses shall be placed on the leveling course within 10 days between May 15 and October 15 of the calendar year and within 3 days when placed between October 15 and May 15 of the succeeding year. The three-day requirement may also be invoked between May 15 and October 15, if conditions such as cracking or disintegration of the leveling course under traffic action or other factors reducing the bond between the courses exist which make it desirable to act in that manner. This is especially true where there is a tendency for cracking in the pavement below to be carried through the successive courses under the action of traffic.

Rolling Requirements

Rolling requirements should be such that at least two rollers weighing approximately 10 tons are required when laying bituminous concrete. The minimum roller requirements should be such that at least one roller is required for each 30 tons laid per hr. Either tandem or three-wheeled finishing rollers may be used but we require that at least one tandem be used for each three-wheeled roller. The three-wheeled finishing rollers are desirable in laying variable depth leveling courses and are an aid in obtaining a dense longitudinal joint.

Trench rollers are used to compact the narrow widening strips inaccessible to a standard roller. It is often desirable to use these rollers in conjunction with a standard width roller when the top of the finished base course is above the edge of the old pavement. We require that the top of the finished base course be ¼ in. above the edge of the old pavement to guard against any possible bridging action.

Our experience shows that the

(Continued on page 170)

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(Continued from page 168)

most satisfactory results are obtained when the operations are carried on with the least number of stops. Plant operations and trucking should be coordinated to assure a uniform flow of materials to the paver. The temperature of the mix should be kept as low as is consistent with good laying practices dependent upon air temperatures. Normally we find it possible to lay at mix temperatures from 240 to 260 deg. F. However, when the air temperature is low it may be necessary to increase the mix temperature to 300 deg. F.

We used 85-100 penetration asphalt almost exclusively in our plant-mix type until this year. However, we experienced some displacement under traffic action on some of our more heavily traveled routes and have recently specified that 70-80 penetration asphalt be used except on light traffic routes. We have employed an RT-12 material in our bituminous concrete using tar. It is desirable to use as highly flexible material as practical consistent with traffic and temperature conditions in order that the life of the surfacing will be as long as possible. It is apparent that it is necessary that a slippery condition be guarded against along with the other considerations.

One-Way Traffic

On two-lane projects we require that one-way traffic be maintained with the movement of such traffic being kept to a minimum and controlled with watchmen. Ordinarily there is less confusion to traffic if the paver is operated toward the plant making it unnecessary for the contractor's trucks hauling bituminous concrete to use the one-way traffic lane.

Normally the resurfacing of an old established road necessitates the addition of material to the shoulders to effect a transition from the new surfacing to the existing shoulder. In most cases we have accomplished this by the addition of granular material so graded that it may be compacted. Several types of spreading boxes have been used with success in applying this material including the same box as is used in spreading base widening mixtures. On projects involving widening the excavated material is used in the new shoulder section adding such other material as may be required.

While we have confined our dis-

(Continued on page 172)

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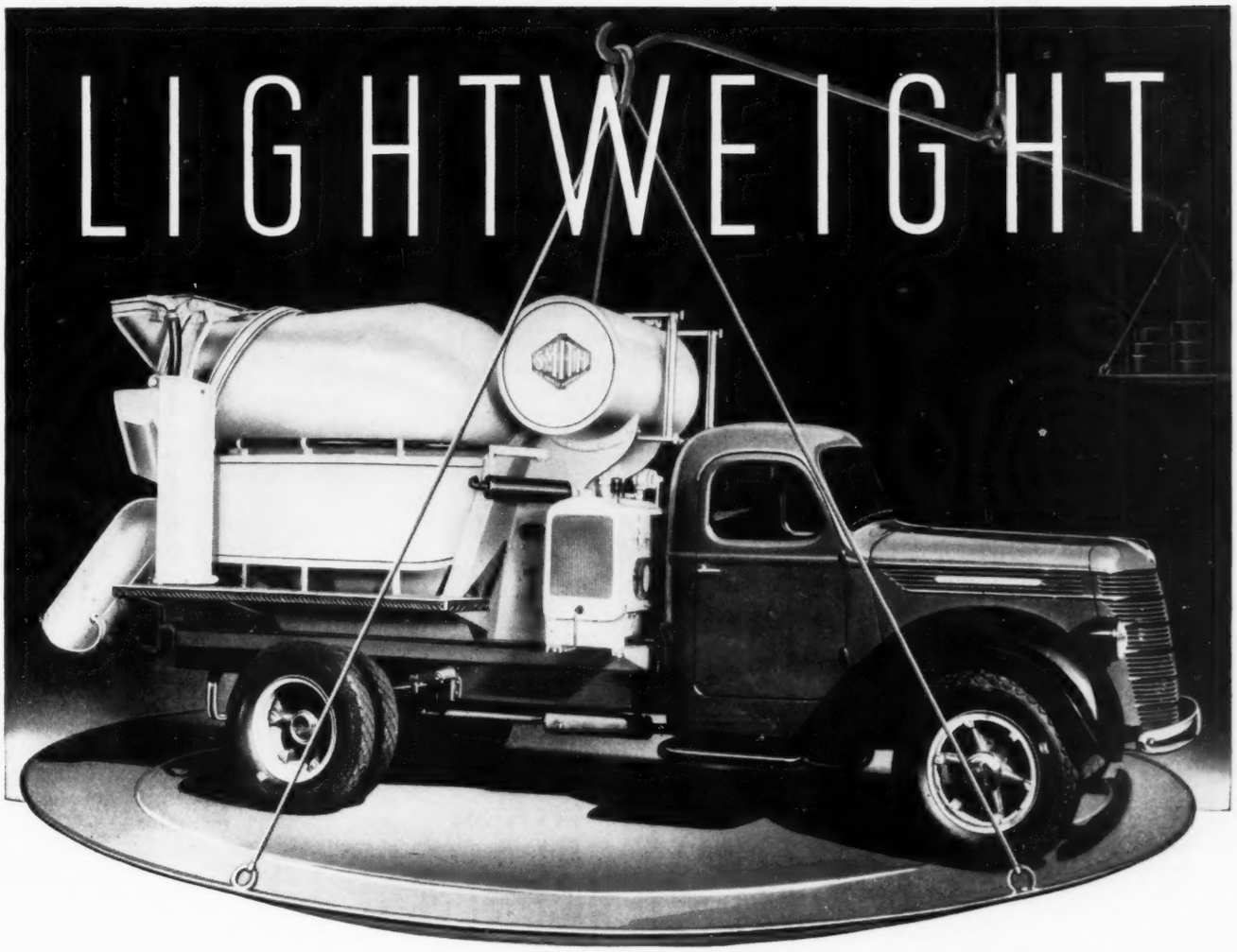

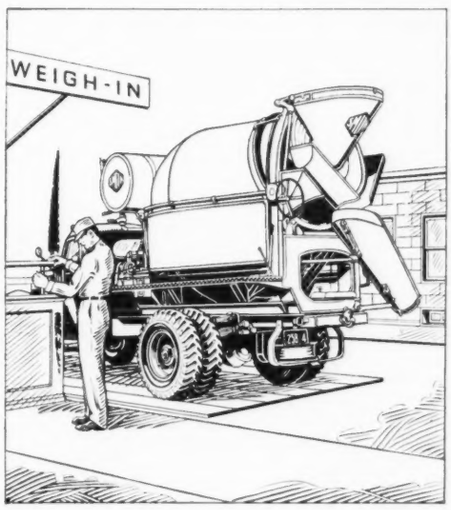

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(Continued from page 170)

cussion primarily to the laying of bituminous concrete with paver units, we also do some of this same type of work with a full width finishing machine operated from steel forms. In operating in this manner it is necessary either to shovel the material from dump boards to the screed or to spread it with a spreader ahead of the finishing machine. It is apparent that more labor is necessary in this type of construction in setting forms and handling of bituminous concrete. However, the accurate crown control possible when laying with a full width finishing machine from forms may make it desirable in some instances to specify this type of construction.

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Material-Handling Devices

(Continued from page 87)

the first class. They were procured by direct purchase order. Second-class items were more easily procured. On these, the requirements were determined by the depot, based on past shipping experience and good judgment. The procedure used for procuring items in this class was called the stock control plan, a flexible system that permitted maintenance of adequate stocks to meet all normal requirements without too heavily stocking the depot. Bureau special items were procured by Chicago on specific bureau directives which indicated the exact quantities required by the depot to which they were to be delivered. These purchases covered non-standard items, and only such of these as were to be trans-shipped promptly.

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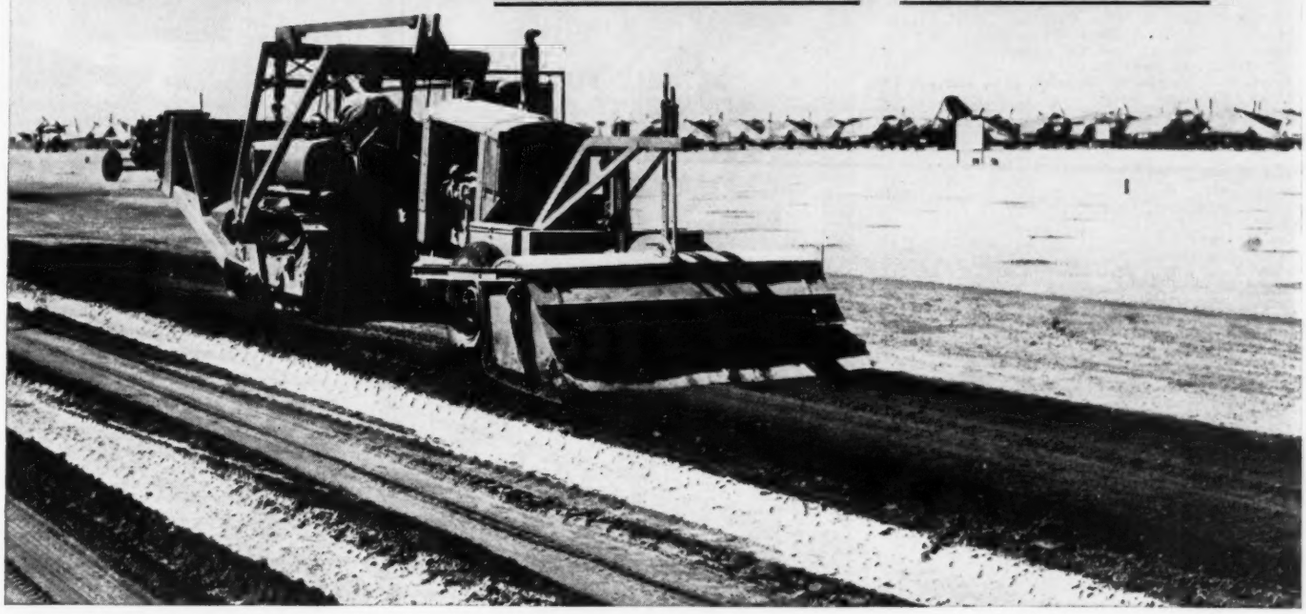

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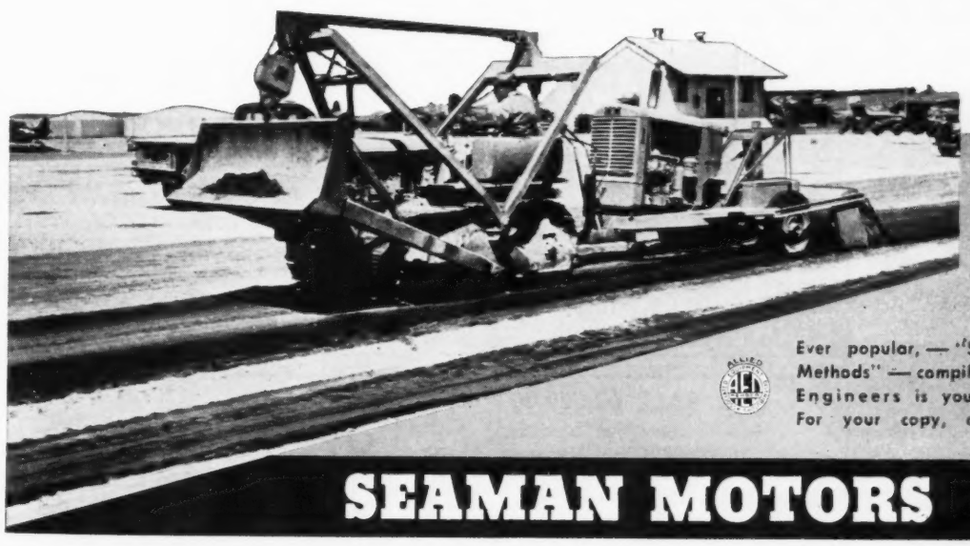

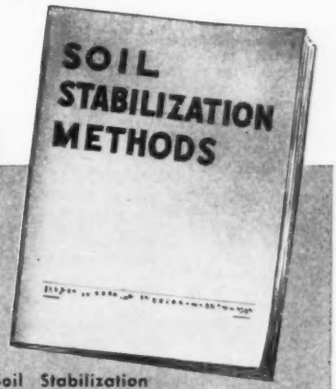

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(Hazard Wire Rope Division 27
American Hoist & Derrick Co. 60, 160
American Manganese Steel Div.,
American Brake Shoe Co. 126
American Steel & Wire Co. 140
Armco Drainage & Metal Pdts., Inc. 154
Armstrong Bros. Tool Co. 176
Armstrong Rubber Co. 143
Assoc. Gen. Contrs. of America, Inc., The 70
Athey Products Corp. 15
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Austin-Western Co. 55

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Bay City Shovels, Inc. 26
Bemis Bro. Bag Co. 65
Bethlehem Steel Co. 12
Blackhawk Mfg. Co. 44
Blaw-Knox Div., Blaw-Knox Co. 29, 142
Briggs & Stratton Corp. 114
Bristol Co., The 164
Buckeye Traction Ditcher Co. 161
Bucyrus-Erie Co. 122
Butler Bin Co. 34

Caine Steel Co. 47
Carlyle Rubber Co., Inc. 138
Carter Co., Ralph B. 174
Caterpillar Tractor Co. 18, 19
C. H. & E. Mfg. Co. 174
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C.I.T. Corporation 135
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Gar Wood Industries, Inc. 20, 125
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Harnischfeger Corp. 30, 31
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(Continued on page 176)

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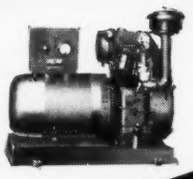

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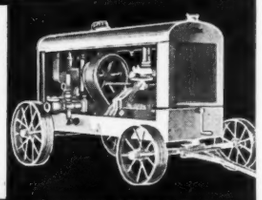

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Advertisers Index

(Continued from page 174)

Keystone Asphalt Products Co.....159
Koehring Company, The..... 46

LaPlant-Choate Mfg. Co., The..... 35
Laughlin Co., The Thomas.....120
Leschen & Sons Rope Co., A.....127
Le Tourneau, Inc., R. G.....48, 49
Lima Locomotive Works, Inc..... 62
Link-Belt Speeder Corp.....141
Littleford Bros., Inc.....149
Lone Star Cement Corp..... 5
Lufkin Rule Co., The.....166

Macwhyte Co..... 6
Mall Tool Co.....170
Marmon-Herrington Co., Inc..... 13
McGraw-Hill Book Co., Inc.....166, 172
McKiernan-Terry Corp.....164
Mercer-Robinson Co., Inc.....162
Michigan Power Shovel Co..... 68
Mixer Manufacturers Bureau..... 53
Moretrench Corp..... 42

National Lead Co..... 28
Northwest Engineering Co..... 11
Novo Engine Co..... 21

Oakite Products, Inc.....148
Oliver Corp., The.....2, 3
Osgood Co., The.....151
Ottawa Steel Products, Inc.....156
Owen Bucket Co., The.....168

Page Engineering Co..... 40
Parsons Co., The.....134
Perfection Steel Body Co., The.....132
Pettibone Mulliken Corp..... 57
Piper Mfg. Co., R. J.....160

Rapid Pavement Breaker Co.....152
Reconstruction Finance Corp.....175
Republic Rubber Div.,
Lee Rubber & Tire Corp.....158
Robinson Air-Activated Conveyor System
Div., Morse-Boulger Destructor Co.....158
Rodgers Hydraulic, Inc..... 43
Rogers Bros. Corp.....150

Searchlight Section.....174, 175
Schramm, Inc..... 63
Seaman Motors.....173
Shell Oil Company.....137
Shunk Mfg. Co.....120
Siebring Mfg. Co.....130
Sinclair Refining Co.....147
Skilsaw, Inc.....119
Smith Co., The, T. L.....171
Snap-on Tools Corp..... 25
Socony-Vacuum Oil Co., Inc.....58, 59
Sonoco Products Co.....176
Southwest Welding & Mfg. Co..... 73
Standard Oil Co. (Indiana).....167
Standard Oil Co. (California)..... 51
Standard Steel Works..... 64
Sterling Machinery Corp.....174
Sterling Wheelbarrow Co.....146
Sullivan Machinery Co.....117
Syntron Co.....160

Templeton, Kenly & Co.....170
Texas Company, The.....38, 39
Thermoid Company..... 24
Thew Shovel Co., The..... 52
Timken-Detroit Axle Co., The..... 54
Timken Roller Bearing Co., The.....4th Cover
Trojan Powder Co.....148

Union Iron Works, Inc.....142
Union Metal Mfg. Co., The..... 50
Unit Crane & Shovel Corp.....116
United States Steel Corp., Subsidiaries..111, 140
Universal Atlas Cement Co.....111
Universal Engineering Co.....163

Viber Company, The.....145
Vulcan Iron Works.....154

Warner Bros. Co., The (Spiratube Div.)..... 23
Wellman Engineering Co., The.....162
White Mfg. Co.....166
Whiteman Mfg. Co.....136
Wickwire Spencer Steel Co.....155
Wood Shovel & Tool Co., The.....144
Worthington Pump & Mach. Corp.....120, 121

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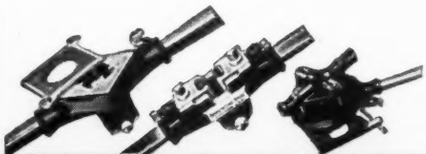

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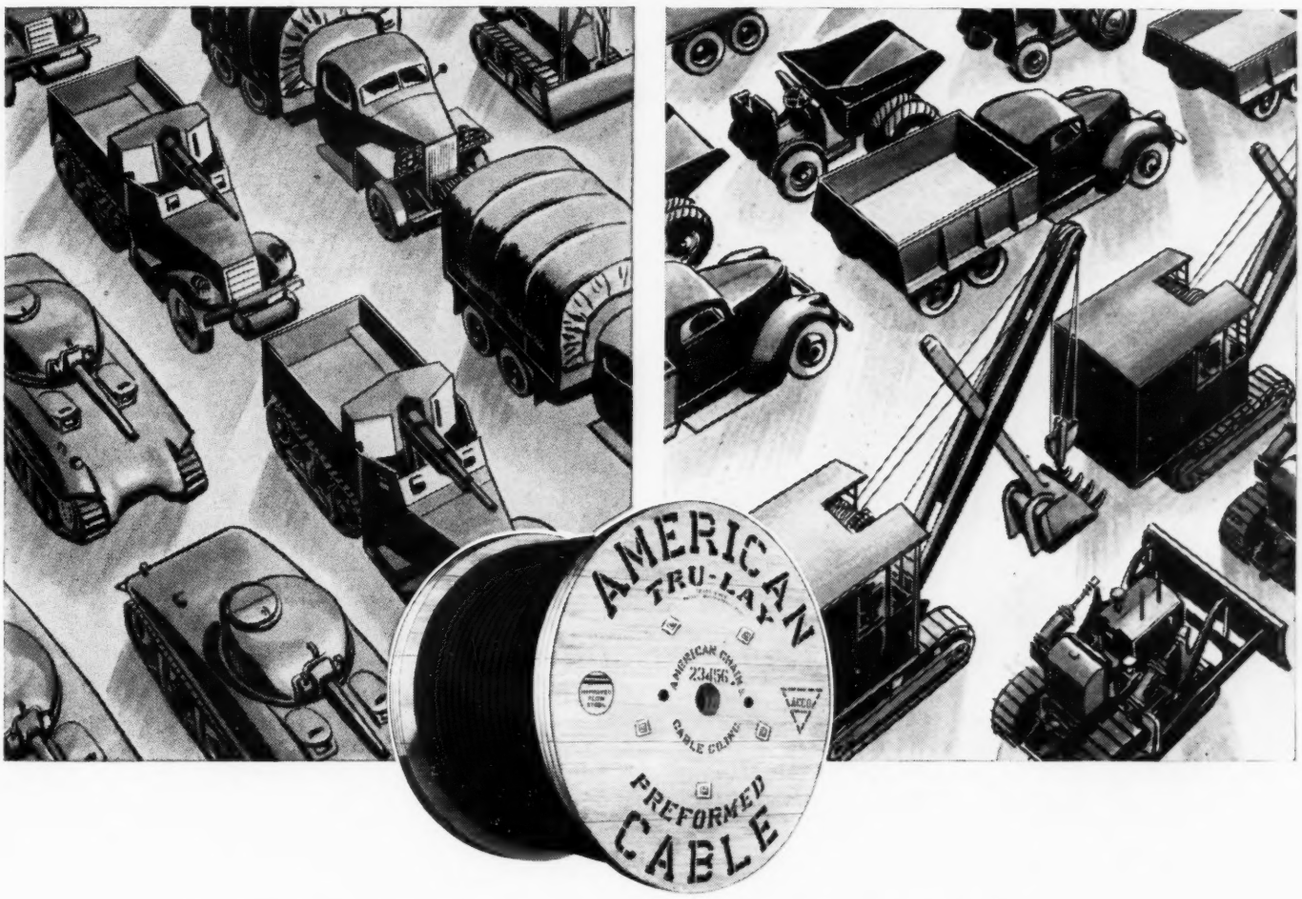

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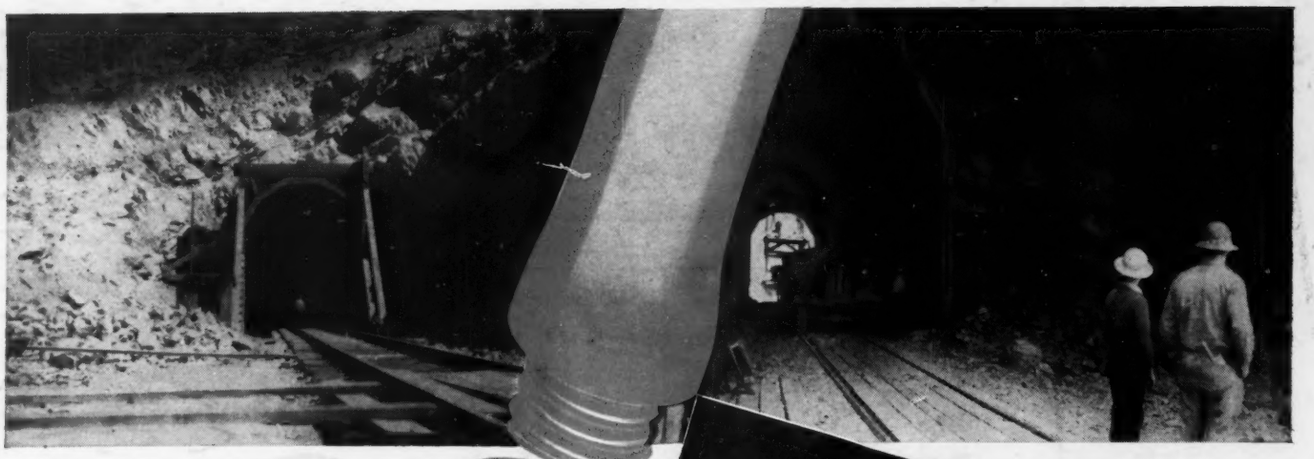
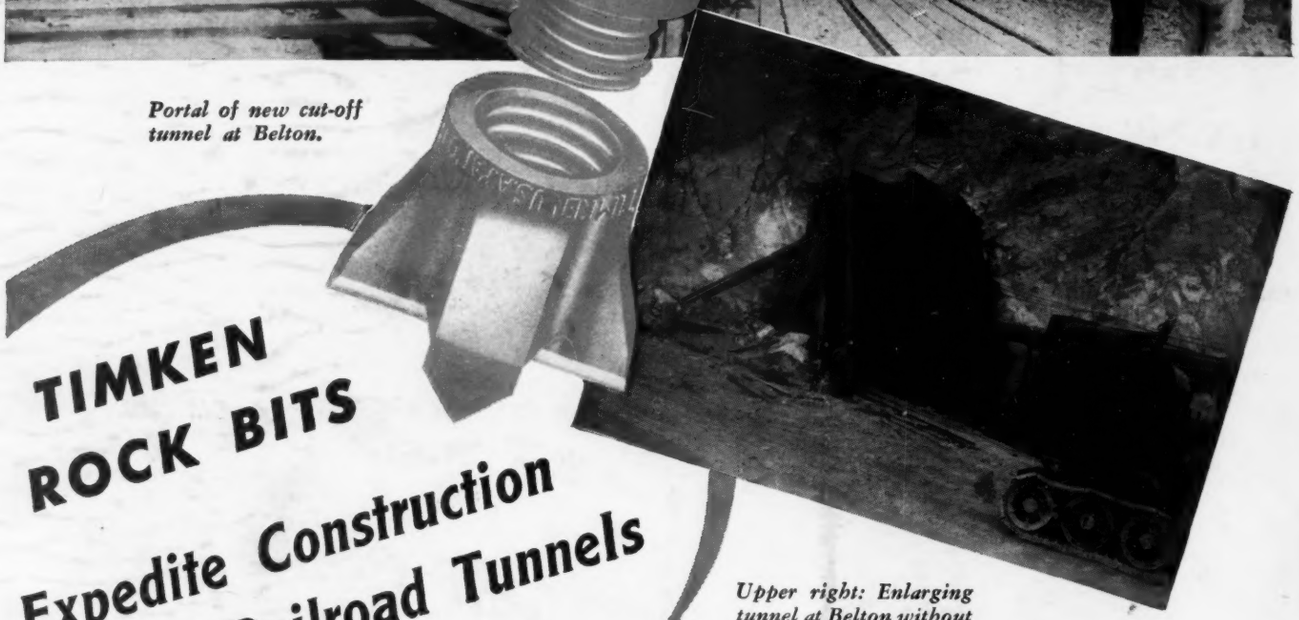


Portal of new cut-off tunnel at Belton.



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Upper right: Enlarging tunnel at Belton without interrupting train traffic through original bore. Lower right: Portal of new cut-off tunnel at Newport.

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